Railway Age

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Notable Individual Railway Records

THE present situation of American railroads as regards operating efficiency has not been reached without the establishment of many records by individual railroads, operating divisions and employees, which are not only notable, but extremely stimulating and inspiring. A few examples selected at random may be mentioned by way of illustration. In 1925 the Madison division of the Chicago, Milwaukee & St. Paul made an average of 301,568 miles per engine failure, using the strictest definition of that term, while the Hastings & Dakota division of the St. Paul averaged 2,463,420 miles per hot bearing in 1925. Recently the Oelwein shops of the Chicago Great Western, employing a total of 1,260 men, completed a period of 468 days and 2,752,705 man hours of labor without a single reportable personal injury. The St. Louis-San Francisco has been making a systematic attempt to reduce rough handling of freight cars, and in the first seven months of 1926 the Springfield division of this road damaged only seven of a total of 457,453 cars handled. On the entire Frisco system 2.86 per cent more cars were handled than in the first seven months of 1925 with 6.78 per cent less damage. One of the best individual records recently made public was that of C. J. Barnett, an engineman running on the Panama Limited of the Illinois Central between Memphis, Tenn., and Canton, Miss., a distance of 188 miles. Mr. Barnett was introduced at the Traveling Engineers' convention in Chicago last week as an engineman who, during the past ten years, has never failed to handle his train on schedule or better time over the division. General interest in individual records is conducive to better average performance.

Labor Turnover

NO one will question the advisability or the importance of doing everything possible to reduce labor turnover to a minimum. Marked progress has been made in this respect in this country, particularly on the railroads, during the past few years. A rather interesting point of view was developed at the Conference on Human Relations at Silver Bay, however, when Harrington Emerson stated that the turnover in this country was far greater than in any other civilized nation, direct comparisons being made with Mexico as an illustration. It was pointed out by others, however, that no matter how much care is used to improve working conditions and supervision, there is bound to be a certain amount of wholesome discontent in this country, where we do not recognize class distinctions and where advancement or promotion depends on the individual's ambition and ability. There will, of course, always be some rolling stones who do not have the character or stick-to-itiveness to make good and who are quite likely to flutter about from one job to another; on the other hand, the very spirit of our republic is such that there will always be a certain wholesome discontent among a limited group of ambitious and venturesome young men and women. This will result in a certain amount of turnover in our offices and shops and among our supervisors. Some of those who took part in the discussion at Silver Bay were, therefore, insistent that while we should strive to reduce turnover to a minimum, it is not at all desirable to attempt to go to the limits of discouraging or overcoming a wholesome discontent on the part of certain types of the younger employees; indeed, one of the delegates insisted that from the standpoint of progress we would be remiss in our duties if we did not make a reasonable effort to encourage such a spirit of discontent, particularly since, while it might affect the turnover in a given department, it need not necessarily in many cases affect the turnover in a large organization when considered as a whole.

Another Railroad Club Activity

A UNIQUE experiment, not mentioned in the comment on railroad club activities in the *Railway Age* of September 18, is the competitions for papers, suitable for presentation before the club, which have been promoted by the Canadian Railway Club during the past two years. These are open to all the members of the club holding positions junior to those of foreman, chief draftsman or traveling engineer. The competition for the year 1925-26 covered papers on a car subject, the first prize being awarded to R. M. Mochrie, a draftsman on the Canadian Pacific. It discussed box car side frame design and was presented at the September meeting of the club. The competition for the previous year covered discussions of locomotive design, six papers being entered in the contest. The object of the competitions is obviously to encourage a greater interest in the club activities on the part of the so-called junior members or those holding the less important positions. Railroad club officers in most cases are wide awake to the fact that the strength and real success of a club depends on the extent to which the membership at large actually takes a real interest in it and participates in a constructive way in its activities. Various expedients are being tried to assign definite tasks or responsibilities to as large a percentage of the membership as possible. These prize competitions apparently help to stimulate interest on the part of some of the club members who might not otherwise take an active part in the proceedings. It is understood that the Canadian Railway Club officers, on the basis of experience with these competitions during the past two years, may revise the basis and possibly some of the conditions under which the competition is promoted. The project thus far, however, is regarded as highly successful, although it is believed there are possibilities of making it still more effective. The outcome will be awaited with interest and undoubtedly

will be helpful to the other clubs and possibly also to some of the many local supervisors' clubs or associations which have been formed during the past year or two.

More Financing with Stock

THE question of what dividends a railroad should pay, if it is able to pay any, should be considered, like every other question confronting railroad managements, not merely as an ordinary business question but with regard to the effect the policy adopted is likely to have in the long run upon public sentiment and government regulation. Any policy which, if adopted, will tend to make public sentiment hostile and government regulation increasingly restrictive, will in the long run be inexpedient for the railways, even though it would be a wise policy in any other business.

A rule of thumb which some railroads formerly had was that of trying to invest one dollar of earnings in improvements in their property for each dollar paid out in dividends. This investment of earnings, it was believed, would so safeguard investors in the railway's securities as to enable it to market bonds bearing a comparatively low rate of interest and also to sell its stock at prices that would be high in proportion to the dividends paid upon it.

Because of the decline of the net income of many railways in proportion to their property investment and capitalization which began about fifteen years ago, there was a long decline in both the dividends they could pay, and in the earnings left after paying dividends, which could be invested in the properties. This impaired their credit, reduced the market prices of their stocks, made it necessary for them to finance more largely with bonds and increased the rate of interest that they had to pay on their funded debt.

When in the past the net income upon stock has increased the dividends paid have not increased in proportion, and when net income has declined the dividends paid have not declined in proportion. In good years a large part of the increased net income has been invested in the properties and has augmented the so-called "surplus." But the general decline in the net income earned per share has been accompanied by a general decline in the dividends paid, as a consequence of which, as was pointed out in an editorial in these columns last week, the total dividends paid last year were less than those paid fifteen years before. An increasing part of the capital invested in the railways has been raised by issuing funded securities, and a decreasing part has been raised by selling stock. In consequence, while in 1911 only 54.6 per cent of the outstanding capitalization represented indebtedness, in 1924 57.2 per cent of it represented indebtedness.

The increase in the net income upon stock which has occurred within the last five years, and especially in 1925 and 1926, makes available two sources from which many railways can get a larger amount of money for investment without increasing their indebtedness. First, they can keep the increased net income and invest it, or, secondly, they can use part or all of it to pay increased dividends, which will increase the market prices of their stock and enable them to issue more new stock and in this way get more of the new capital required.

Practicaly speaking, therefore, a railway which is getting enough net income to pay sufficient dividends to make its stock marketable has available three means of getting money for the improvement and enlargement of its property. It may sell funded securities, or invest earnings, or issue new stock, or employ all these three methods.

Regarding the matter from the standpoints both of sound financing and of the probable effect upon public sentiment, it is an interesting and important question what policy would be the wisest for the railways that are able to pay substantial dividends to follow. If new bonds are issued the railway incurs no additional burden except that of paying the interest upon these bonds. If earnings or invested in the property its earning capacity is increased without the assumption of any additional obligation with respect to the payment of either interest or dividends. If the rate of dividend is increased, more dividends must be paid on the stock already outstanding, as well as upon all the new stock issued. In consequence, financing which involves an increase in dividends and the issuance of new stock increases the outlay made to raise new capital more than any other method.

There are, however, serious dangers in protracted financing on a large scale which does not include the sale of a large amount of new stock. Financing mainly by the increase of funded debt necessarily involves a corresponding increase in fixed charges. So many railways in this country have been bankrupted as a result of this policy that its hazards do not need to be dwelt upon. It has not only resulted in the ruin of many railways in bad years, but it has one bad effect in good years. When earnings are good the result of past financing mainly with bonds and notes is to cause such a large part of the increased earnings to be carried to net income as to inflate the earnings reported upon each share of stock. These large earnings upon each share of stock, when heralded throughout the country, give an exaggerated idea of the prosperity of the railways making them and help create a demand for advances in wages or reductions of rates.

To a great extent the same thing is true of the investment of earnings. This increases the so-called "surplus" of the railways, and the large aggregate "surplus" accumulated in past years by the investment of earnings which might have been paid out in dividends has been made an argument for advances in wages and reductions of rates. Likewise, the direct investment of earnings, by increasing the earning capacity of the property without any corresponding increase in its capitalization, increases the net income reported per share of stock. When traffic and total earnings become large, the relatively larger increase that occurs in the earnings on each share of stock attracts attention, which is more widespread than intelligent, and is used, as already indicated, as an argument for advances in wages and reductions in rates.

Largely owing to the way the railways have been financed in the past there occur great fluctuations in their average net income per share of stock, and especially in the net income per share of railways that have been financed to a great extent by the issuance of bonds. The average net income per share of all stock, as reported by the Interstate Commerce Commission, was in the year ended June 30, 1910, $7.28, while in the year ended June 30, 1915, it had declined to $4.11. In the year ended December 31, 1916, it increased to $8.40, and in 1917 was $7.31, while in 1921 it declined to $3.94. In 1922 it was $4.85 and in 1923 it increased to $6.95. The fluctuations in the net income per share on the stock of many individual railways are much greater. The fixed charges of some of them are relatively so high that in poor years they are threatened with bankruptcy, while in good years their net income per share is so large as to be made the basis for the charge that they are making too much money.

A consideration of great importance is the need for a wider diffusion of the ownership of railway stocks. Any stock upon which the net income per share fluctuate from nothing or less than nothing in lean years to a large amount in good years is too speculative for the average investor to buy. If there is ever to be a wide enough diffusion of the ownership of railway stocks there must be an increase in the number and volume of stocks upon which substantial dividends will be paid year by year, and if dividends are to be made more stable the net income per share must be made more stable.

Undoubtedly the fear that public sentiment would be antagonized by increases in the rates of dividend paid has influenced some railway managements to keep down dividend rates and invest large amounts of earnings directly in the properties. Subsequently in some cases parts of the surpluses thus created have been capitalized by the issuance of stock dividends. In any other business this would be regarded as sound policy. It postpones increases in aggregate dividends until the economies secured by increased investment have made it reasonably certain that the larger dividends can be paid indefinitely. Unfortunately, a large part of the public regards the issuance of stock dividends as "stock watering," and this is a policy which when adopted by a railway always is attacked and which it is extremely difficult to defend effectively in the forum of public opinion.

Past experience seems to constitute a strong argument for railways doing as much financing as practicable by the sale of new stock to investors and securing as wide a diffusion as practicable of the ownership of their stock. Apparently there are more railways now that could pay reasonable dividends and sell new stocks to the public than there have been for more than a decade, and the policies that have been followed within recent years by many large public utilities in increasing dividends and selling stock to the public seem to merit more general imitation by the railways.

Truth About the "Surcharge"

THE railways and the nation repeatedly have been threatened within recent years with rate regulation by act of Congress. Why the entire regulation of rates should be delegated to a body such as the Interstate Commerce Commission, which is less subject to political influence than Congress and can thoroughly investigate upon their merits the rate controversies that arise, could not be better illustrated than by the glaring inconsistencies in the policies of rate regulation favored by some of the public men who are foremost in favoring measures by the adoption of which Congress would directly regulate rates.

The passage by Congress of the Hoch-Smith resolution directing the Interstate Commerce Commission to make a general investigation of freight rates was the outgrowth of agitation for a change in rate making which would result in freight rates being made relatively lower on farm products. It was predicated on the assumption that rates for different kinds of transportation service should be based more nearly on "what the traffic will bear" and that the adoption of this policy would result in making freight rates on farm products relatively lower because the prices of farm products were relatively low.

At the very time when the Hoch-Smith resolution was going through Congress some of the same public men who voted for it were advocating the abolition of the so-called "Pullman surcharge," and while the commission under this resolution has been making its investigation of freight rates the agitation for the abolition of the surcharge has been continued. Meantime, both before and since the passage of the Hoch-Smith resolution, the passenger earnings of the railways have been proving that on the principle of charging "what the traffic will bear" the surcharge on passenger tickets is one of the most easily justifiable charges ever made.

It has previously been shown in these columns (*Railway Age*, July 3, page 3) that between 1921 and 1925 the passenger earnings of the railways from day coach business declined 22 per cent, while their earnings from sleeping car and parlor car business (including the surcharge), increased 22 per cent. Statistics of the Interstate Commerce Commisison for the first seven months of 1926, which have just been issued, show that both the tendency of travel in day coaches to decline and the tendency of travel in sleeping and parlor cars to increase continue to prevail as they have constantly since 1920.

The total passenger earnings of the railways in these months were $602,427,298, which was $5,497,036 more than they were in the corresponding months of 1925. The surcharge adds about 10 per cent to the railway fare paid by passengers riding in sleeping and parlor cars, and it is therefore possible to calculate with approximate accuracy the amount of passenger earnings derived from passengers riding in sleeping and parlor cars and from those riding in day coaches. In the first seven months of 1925 the earnings of the railways from sleeping and parlor car passengers (including the "surcharge") were about $240,491,000, or 40.3 per cent of their total passenger revenues. In the first seven months of 1926 the earnings of the railways from sleeping and parlor car passengers (including the "surcharge") were about $261,764,000, or 43.5 per cent of their total passenger earnings. The increase was about $21,273,000.

Contrast these figures with those for earnings from day coach service. In the first seven months of 1925 these earnings were about $356,419,000, or 59.7 per cent of total passenger earnings, while in the first seven months of 1926 they were only $340,663,000, or about 56.5 per cent of total passenger earnings. The decline in the earnings from day coach service was about $15,756,000. The increase in railway earnings from parlor and sleeping car service was almost nine per cent, while the decrease in the earnings from day coach service was about 4.5 per cent. In July, the last month in this period, the increase in railway earnings from sleeping and parlor car service was about $2,726,000, while the decline in the earnings from day coach service was about $2,906,000, the result being a net decline in total passenger earnings.

Of course, the continuing decline in earnings from day coach service is due to the increasing competition of private automobiles and the motor bus. Why does travel in sleeping and parlor cars continue rapidly to increase? The obvious answer is that an increasing number of people prefer to ride in sleeping and parlor cars and pay the regular passenger fare plus the "surcharge" rather than ride in day coaches and pay only the regular fare. In other words, the verdict of an increasing number of travelers is that the regular passenger fare plus the surcharge is a reasonable charge in proportion to the quality of the service rendered for them.

It is a well known fact that the earnings of the railways of the western district do not yield a fair return, and sooner or later changes must be made in their rates which will increase the net return earned by them. The earnings of the railways as a whole from the surcharge are about $40,000,000 annually and the railways

of the western district get about $17,000,000 of this. If the western lines should be deprived of this revenue it would have to be made up to them by advances in day coach fares or in freight rates. Do the farmers of western territory believe this should be done? The railways of eastern and southern territory are not seeking advances in freight rates, but the principle involved is the same in all parts of the country. The abolition of the surcharge would simply be one kind of a general reduction in rates. Do the shippers of eastern and southern territory believe that the first general reduction in rates made should be for the benefit of those who travel in sleeping and parlor cars because they prefer to travel in them, regardless of the fact that it is somewhat more expensive than traveling in day coaches?

There is hardly a shipper in the country, whether farmer, coal mine operator, manufacturer or wholesale merchant, who would not say that if any general reduction of rates is to be made it should not be made first in the rates charged for travel in sleeping and parlor cars. Nevertheless, men who travel for large business concerns constantly, through their organization, carry on agitation against the surcharge. A bill to abolish it was once passed in the Senate. Another bill to abolish it was introduced at the last session of Congress. No doubt the passage of a similar bill will be urged at the next session of Congress. On every sound principle of rate making the agricultural and business interests of the country should show such strong opposition to such legislation that all possibility of its passage will be destroyed.

Information for Stockholders

PROFESSOR WILLIAM Z. RIPLEY of Harvard University has aroused the lions again by writing for the September Atlantic Monthly another article criticizing an additional feature of the policies of large corporations. A few months ago he wrote for the same publication an article on non-voting stock, which article, because of the medium which carried it, of the recognized standing of its author, and of the very power of the argument, was awarded prompt and pertinent attention. Notably it induced the New York Stock Exchange to be critical of non-voting stock issues and it is credited with having led the Interstate Commerce Commission to frown seriously on the non-voting preferred stock proposed in the Van Sweringen merger.

The new article bears the ominous title, "Stop, Look, Listen," and deals with the stockholders' right to adequate information. Reference is made primarily to the annual reports of industrial corporations and the criticisms of some of the extremely meager documents issued as annual statements by such leading companies as the National Biscuit Company, the American Woolen Company, the Allied Chemical & Dye Corporation, etc., are done in the best of the clean-cut, forceful style of which Professor Ripley is capable. The corporations in question give their stockholders practically no information about their affairs, Professor Ripley alleges, a skeleton income account if any, possibly an attenuated balance sheet and comment of the vaguest possible sort. Criticisms of this kind may apply with considerable force to the policies of some of the railway supply concerns and, indeed, two or three such are mentioned more or less in passing in the article. They do not, of course, apply to the railroads which, because of Interstate Commerce Commission requirements for the reporting of accounts and statistics, supplemented by a general attitude of greater responsibility to the public, are, speaking with due regard to certain notable exceptions, a wide-open chapter. Therein lies the leading point to railroad men of Professor Ripley's article. For once, he has left the railroads out of one of his critical reviews.

The Professor has in the past taken up the cudgel of criticism of railroad policies frequently and with considerable effectiveness. His two books, still the authorities on their subject, "Railroads, Rates and Regulation" and even more "Railroads, Finance and Organization" are anything but panegyrics of railroad management. We hope we can presume that nearly entire omission of railroads in the present literary effort is not by mere chance. We should like to believe that Professor Ripley is ready to agree that the railroads have now reformed and are no longer the wicked aggregations of misused power that in his books and elsewhere he has hitherto led the student to believe they were.

As a matter of fact, there is much reason to believe that Professor Ripley is really taking a more kindly attitude, because he is quoted in the Wall Street Journal in an interview on his present article as saying, "The railroads now have uniform accounting methods, full publicity of reports, are operating at the highest efficiency in their history, and are financed on a sound basis. Railroad securities are now on the point of being the securities best fitted to be a safe possession for the average investor." We could wish that he had put this in his article. It is something that prospective buyers of securities who will read the article ought to know.

New Books

Employee Representation. By Ernest Richmond Burton, Bureau of Personnel Administration, New York, with a foreword by Dr. Henry C. Metcalf, director, Bureau of Personnel Administration. 283 pages, 5½ in. by 8 in. Published by Williams & Wilkins Company, Baltimore, Md. Price $3.00.

This is the fifth volume in "The Human Relations Series" which is being published under the direction of Doctor Metcalf. Readers of the *Railway Age* do not require an introduction to the Doctor. He was one of the three judges in the competition for the best articles on co-operation in the interests of economy and efficiency which was conducted by the *Railway Age* two years ago. Realizing the need for a thorough, scientific study of employee representation, Doctor Metcalf induced a number of individuals and companies to finance the cost of such an investigation. Mr. Burton who had some previous experience in studying employee representation and was particularly well fitted for such a task, was selected to make the study under the direction of Doctor Metcalf.

It was decided to select a few of the many examples of employee representation in this country and then to make a thorough and complete study and analysis of these, rather than to make a more extensive and less thorough survey. In addition to this Messrs. Metcalf and Burton held a number of roundtable discussions with employers who had had experience with employee representation.

Naturally there is a considerable difference in methods and practices on the part of the different industries, because employee representation is such a comparatively recent development in industry. By making a critical study of the different methods and practices, however, and of the various experiments which have been made and the progress thus far achieved, it was possible

to discover the underlying principles of the various activities ordinarily associated with employee representation.

The first two chapters cover an historical synopsis of the employee representation movement and the presentation of the proper background upon which to discuss the question. Two chapters are devoted to the needs and purposes, including one on the sources and nature of modern industrial conflicts and another on managerial objectives of employee representation. Then follow six chapters on organization and procedure, covering such matters as the inauguration and extension of the plan, managerial responsibility for operation, assuring adequate representation of employees, joint conference bodies, course of action and procedure, and organization for integration. A section on administration includes a discussion of some of the problems of operation and their solution, as well as of the need of a periodic audit of progress.

Three chapters are concerned with the results of employee representation, one considering the terms and conditions of employment; another output, efficiency and morale; and the last an evaluation of employee representation. The following significant quotation is taken from the last chapter: "Employee representation requires a higher type of management than is necessary without it. Executives and their staffs need not only to be technically 'on their toes,' but to understand more fully and sympathetically the human values involved in industrial operations. But the greater effort and the keener intelligence which employee representation demands is amply rewarded in the morale which it engenders." Appendices present statistical data relating to certain employee representation plans and a selected bibliography.

It is unfortunate that space limitations prevent a more detailed discussion of the book. It is one of the most complete surveys and analyses that we have seen on any phase of industrial management. It should prove particularly valuable to the large number of railroads that have adopted some form of employee representation for part or all of their employees. Because the development is such a new one, it is important to have a clearing house of this kind, in order to know of the methods and practices used by others and to have an evaluation of the value of the movement as a whole and in its various aspects.

The Air Brake Association Proceedings, 1926. Edited by the secretary, F. M. Nellis, 165 Broadway, New York. 350 pages, illustrated, bound in leather. Price $3.00.

This book contains the proceedings of the thirty-third annual convention of the Air Brake Association which was held at New Orleans, La., May 4-7, 1926. The reports and papers were on air brake hose coupling gages, retaining valve testing, air brake tests of locomotives and trains in accordance with government laws, triple valve repairs, modern freight train handling, manufacture of wrought iron pipe, recent improvements in passenger train braking, better insulating of steam cylinders for air compressors, brake pipe leakage, threading and bending of air brake pipes for locomotives and cars, manufacture of steel pipe, and recommended practice. The table of contents lists all the reports and papers printed in the proceedings since 1894. This is a feature that could be adopted to advantage by a number of railway associations as a part of their printed proceedings. It affords an excellent reference for those who have use for such information and often saves time in locating a report or paper.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Commercial and Industrial Organizations of the United States, compiled by Domestic Commerce Division, U. S. Bureau of Foreign and Domestic Commerce. Latest revised edition listing about 9,000 organizations with their respective headquarters, memberships and dates of annual meeting. Domestic commerce series publication No. 5, 191 p. Pub. by Govt. Print. Off., Washington, D. C. 60 cents.

Markets of the United States, edited by W. C. Plummer and Charles P. White. Includes two articles specifically on railroads—"Handicaps in Selling American Locomotives Abroad," by E. S. Gregg, p. 70-73, and "American Railways and Export Trade," by Sidney L. Miller, p. 167-173. Other articles on foreign trade in various commodities like wheat, live-stock, coal, etc., and on port and inland waterway development may also be of interest. Vo. 127, No. 216 of Annals of American Academy of Political and Social Science, September, 1926. 203 p. Pub. by the Academy, Philadelphia, Pa. $2.00.

Periodical Articles

American Influence on British Locomotives for Chilean Railways, by Harry Campbell. Description of new Garratt locomotives for Chilean Nitrate railways. Commerce Reports, September 13, 1926, p. 687.

Automatic Mechanical Couplers for Railway Rolling Stock, by A. M. Bell. Includes history of coupler development in various countries, with illustrations of types. Journal of the Institution of Locomotive Engineers [Lewes, Sussex, England], May-July, 1926, p. 540-574.

John Stevens, by Archibald D. Turnbull. Biographical sketch of the audacious early American who proposed a railroad across New York State in 1812 when most people had just reached the point of approving a canal. North American Review, Sept.-Oct.-Nov., 1926, p. 440-445.

Labor Economics, by Paul Brissenden. Reviews the attitudes shown towards personnel problems as reflected in outstanding books on the subject from Adams and Sumner's "Labor Problems" of 1905 to Solomon Blum's "Labor Economics," published last year. American Economic Review, September, 1926, p. 443-449.

Murder on the Rails, by "Engineer." Criticises railroads for not installing automatic train control system. North American Review, Sept.-Oct.-Nov., 1926, p. 434-439.

The Railroad's Part in Regional Development, by J. M. Kurn. The president of the Frisco Lines discusses what that railroad system has done for the economic growth of the Ozark region. Executives Magazine, first issue, September, 1926, pages 7-8.

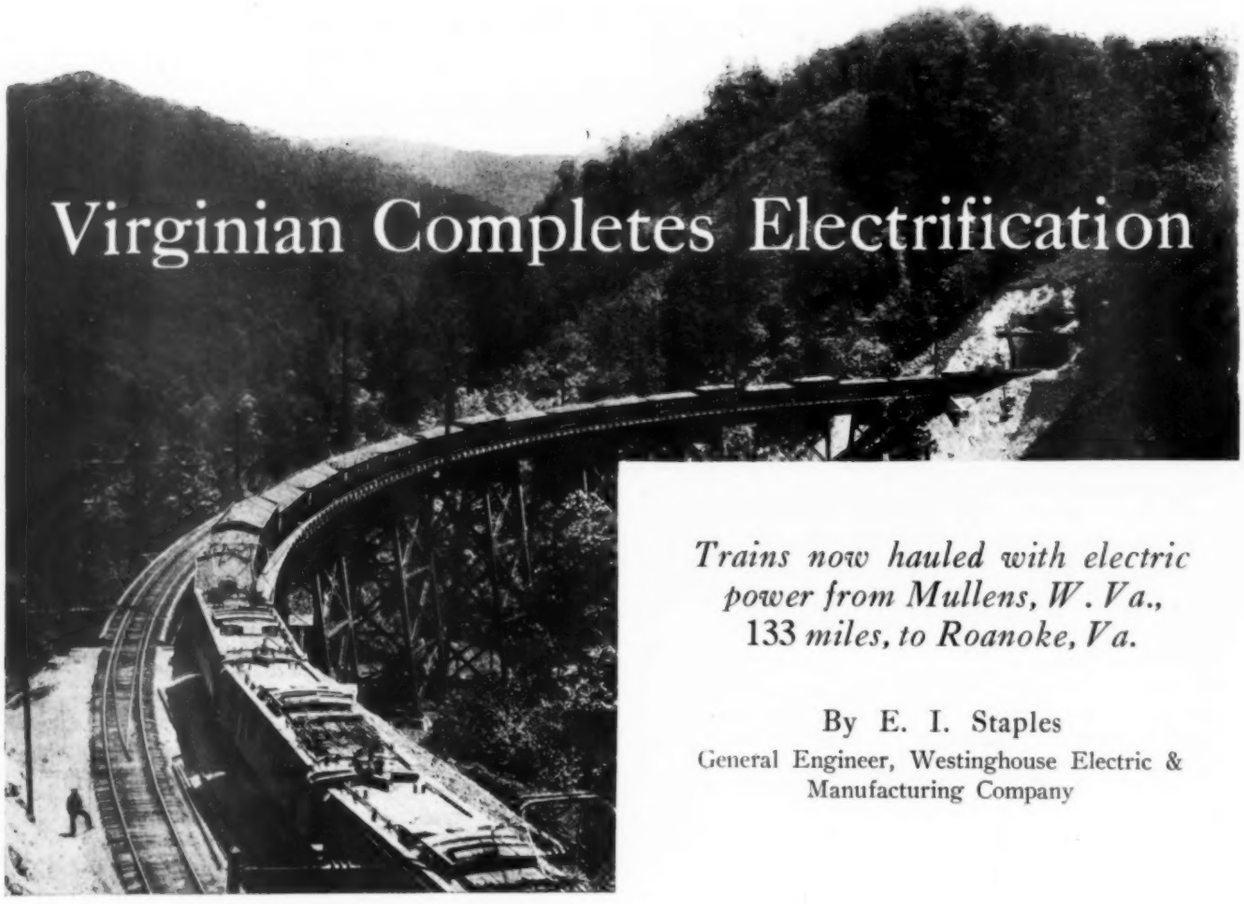
Support Lower Rail Interest Rate, by E. G. Buckland. The vice-president of the New Haven discusses railroad indebtedness to the government under certain sections of the Transportation Act, 1920, and how to refund it. Savings Bank Journal, September, 1926, p. 37-40, 90.

Train Crew Owns Bank Operating in Alaska Wilds. Account of a "side line" of railroaders on the Alaska Railroad that is somewhat unusual. Savings Bank Journal, September, 1926, p. 90.

He Untangled a Railway System, by Linley V. Gordon. Accomplishments of Wm. A. Webb, formerly an official of several railways in this country, now Commissioner of the South Australian Government Railways. American Review of Reviews, September, 1926, p. 297-299.

Railway Shops of the British Isles, by Thomas Lewis. Especially methods of doing boiler work at Eastleigh, Swindon, Crew and Derby. Master Boiler Makers' Association Proceedings, 1926, p. 161-173.

Virginian Completes Electrification



Train Ascending Grade to Clark's Gap, W. Va., Pusher in Foreground

Trains now hauled with electric power from Mullens, W. Va., 133 miles, to Roanoke, Va.

By E. I. Staples

General Engineer, Westinghouse Electric & Manufacturing Company

OPERATION of tonnage trains over the entire electrified zone on the Virginian commenced this week. The electrification now extends from Mullens, W. Va., to Roanoke, Va., a route distance of 133 miles. The initial section from Mullens to Princeton has been in operation about a year. The 11,000-volt alternating current system was selected for this electrification and the system layout was based on twelve and one-half million tons of coal annually, hauled east from Elmore, W. Va. The initial locomotive order of 36 motive power units was intended to handle eight million tons annually.

A power plant, owned and operated by the railway, and located at Narrows, Va., contains four 12,500-kv-a., 25-cycle, single-phase turbo-generators. There are five water tube boilers with provision for a sixth, each rated at 1,521 b.h.p. Pulverized fuel is burned and this system of firing has been found well adapted to rapidly fluctuating loads.

From the generators power passes through four 10,000-kv-a. oil-insulated, water-cooled transformers which raise the potential from 9,800 volts to 88,000 volts. Two transmission lines run east and west from the 88,000-volt bus, to which the high tension windings of the transformers are connected. Seven transformer stations are located along the right-of-way. The transformers in these stations are known as three-coil transformers; the high-voltage winding is connected to the 88-kilovolt line in the ordinary way, but the low voltage is divided into two parts. One of the low-voltage windings produces 11,000 volts and is connected between the trolley and the rail. The other winding feeds a feeder-rail circuit at 22,000 volts. The potential between the feeder and the trolley wire is thus 33,000 volts. The trolley rail windings of all transformers are arranged for reconnection at 22,000 volts when the increased traffic demands of the railway require the higher trolley voltage.

Balancer stations which contain auto-transformers are placed at points between the main transformer stations. These are connected between the trolley and balance wires with a point on the winding corresponding to 11,000 volts from the trolley terminal connected to the rail. The trolley-feeder circuit thus constitutes an auxiliary transmission line.

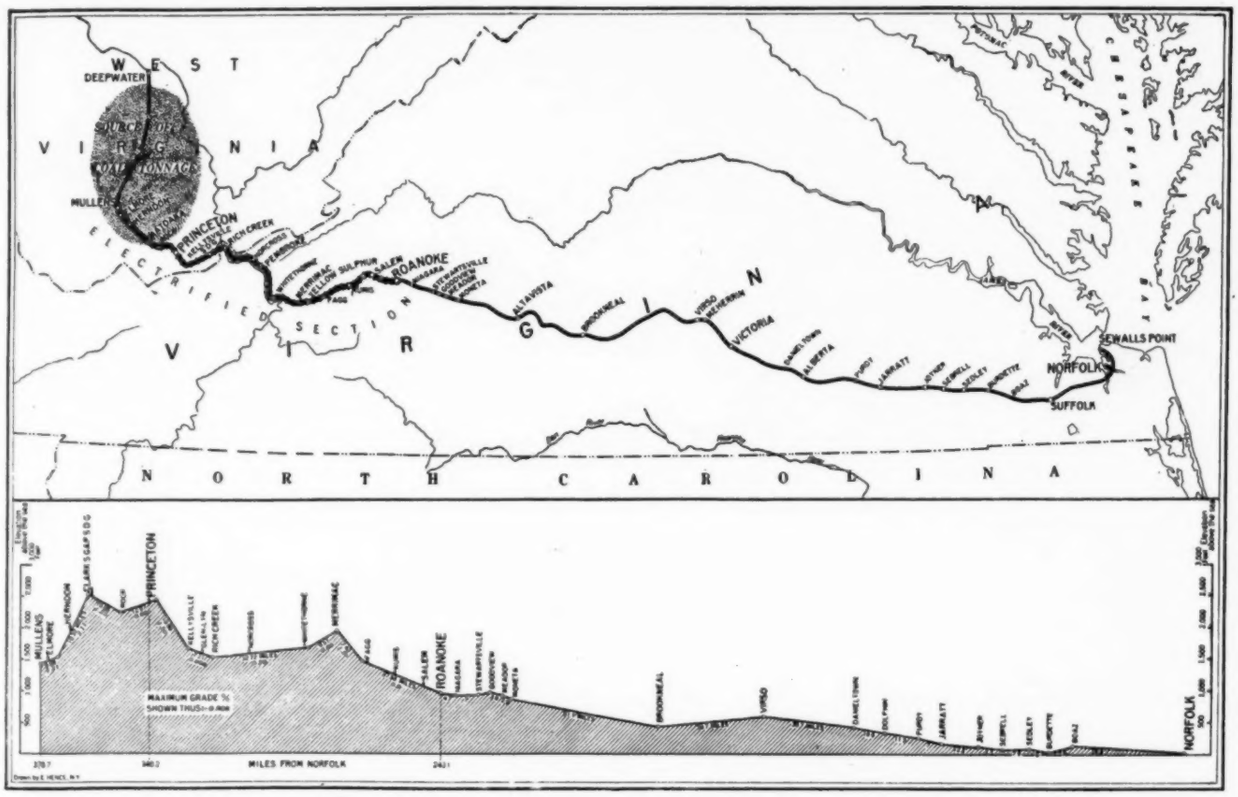
The Locomotives

Each road locomotive, of which there are ten, consists of three motive power units; all units are identical electrically and essentially so mechanically. A control stand is provided in one end of each unit. As has been explained in other articles, these locomotives are of the split-phase type; three-phase traction motors, which receive power from the single trolley wire through the main transformer and a phase converter, are used for driving the locomotives. These motors are arranged for two approximately constant running speeds of 14 and 28 miles an hour.

The mechanical parts of these locomotives were designed with the idea of keeping the structure so rigid in all directions as to enable it to withstand any and all usual service and maintenance conditions. A continuous

casting, upon which is mounted most of the heavy equipment in the cab, ties the locomotive frames together for the full length between the motors. This method of supporting the heavy electrical equipment reduces to a minimum any tendency toward weaving between frames and also adds a large amount of stiffness in a vertical plane.

The locomotive units have a 16 ft. 6 in. rigid wheelbase and a Mikado or 1-D-1 wheel arrangement. The guiding truck, while it follows well developed principles of design, is unusual in one respect; namely, that two restraint elements are used. These elements, the swing link and the cam rocker, are so arranged that the lateral guiding force increases proportionally to the swing up to a limiting value and beyond this swing the truck functions as a constant resistance one. The main advantage of this arrangement lies in the fact that the trailing truck, with its reduced swing, imposes a less severe duty upon the leading driver flange than would be the case with a constant resistance truck.



Map of the Virginian and Profile from Mullens, W. Va., to Norfolk, Va.

Operation of the Electrified Zone

Every effort was made to have the beginning of electric operation cause the least possible trouble and interference with the normal operation of the railroad. A carefully studied program of instruction and training was adopted. A group of men from the railroad was first sent to the plant of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., where the locomotives were built. These men spent several months with the Westinghouse engineers studying the construction and operation of the locomotives. Prior to regular operation, a section of track was set aside at Princeton, W. Va., for instruction purposes. A box car was fitted up with benches, blackboards, etc., and when the first locomotive arrived in July, 1925, actual instruction of enginemen began.

Electrical operation of trains on Clark's Gap Hill began September 15, 1925, and after that instruction work was transferred to Mullens, W. Va. Methods of instruction were similar, except that the added advantage of observing the operation of tonnage trains was possible.

The instruction of enginemen does not stop with their completion of the prescribed course. The road foreman of engines is constantly on the road instructing enginemen in the handling of trains. The Virginian handles trains of larger tonnage on heavy grades than found on any other road and consequently much judgment and care must be exercised by the operators, especially at several places on the profile. A small variation in the manipulation of the controller has a pronounced effect on the smoothness of operation at certain points.

Most of the coal handled by the Virginian comes from mines west of Mullens on the main line and on the Winding Gulf branch. This coal is brought into Elmore yard by steam locomotives, and there trains of 6,000 gross tons are made up. These 6,000-ton trains are taken up the two per cent grade to Clark's Gap, W. Va., by a three-cab road locomotive at the head of the train and a similar locomotive acting as a pusher. The speed is 14 miles an hour and the time required to ascend the grade is 58 minutes.

Sufficient tracks are available at Clark's Gap to provide for filling out trains to 9,000 tons at that point. A road locomotive takes the train east from Clark's Gap. Operation as far as Princeton was begun in September, 1925, and has continued while the trolley line and substations have been in process of erection between Prince-

ton, W. Va., and Roanoke, Va. Now that this work is completed 9,000-ton trains are hauled by one locomotive on the way from Clark's Gap to Roanoke.

Locomotives of the Virginian type are inherently regenerative, and trains are held on down grade without the use of air brakes. In descending from Clark's Gap to Rock, there is a small amount of regeneration. The heaviest grade to be descended by eastbound traffic is the Kellysville Hill, the top of which is just east of Princeton. This grade is approximately eleven miles long and averages 1.26 per cent, compensated eastbound. The descent of this hill under steam operation has always been a problem in air braking, although the safety with which it has been accomplished is a tribute to the development of the air brake and to Virginian operating efficiency. The electric locomotives, being equipped with induction motors, are automatically regenerative. Trains now descend Kellysville Hill without the use of air brakes, the speed being held slightly above the motoring speed by the traction motors acting as generators and returning power to the distribution system. Kellysville Hill is no longer a problem.

The problem of effectively taking a tonnage train down this grade was a factor in deciding on the alternating current system of electrification, employing the split-phase locomotive. This type of locomotive is very positive in its regenerative action and this feature had considerable weight in selecting the system of electrification.

Power is, of course, returned to the line during regeneration and this power can be utilized by other trains which may be drawing power at the time. A considerable saving in energy required by the electrification is effected in this way. Power saving is, however, not the most desired adjunct to regeneration. The wear and tear on brake shoes and brake rigging was severe in the long applications of brakes which were required in going down Kellysville Hill. Brake maintenance on this account was by no means a small item of expense, and its reduction due to regeneration constitutes a saving effected by electrification.

The foot of the grade is at Kellysville, W. Va., and the heavy regenerative load ends at this point. The time required to descend is approximately 44 minutes. From Kellysville, W. Va., to Rich Creek, Va., the average grade is still descending but the load is light. At Rich Creek the train starts on a long up grade to Whitethorne, Va., approximately 33 miles, averaging less than 0.2 per cent. In this section, and in the section between Fagg, Va., and Roanoke, Va., the train is operated at 28 miles per hour. The descent of Merrimac Mountain is about the same as regards regeneration as Kellysville, but the distance is less.

Westbound movement on the Virginian is almost entirely of empties. The normal train, corresponding to equalized movement, weighs 2,800 tons. The handling of this weight train presents no difficulties to a three-unit road locomotive.

As the complete electrification has just been put in operation, it is impossible now to compare actual operating costs with estimated ones. However, costs on the Mullens-Princeton section, which has been in operation about one year, are available and they strongly indicate the success of the complete undertaking.

THE SOUTHERN announces that telephone train dispatching circuits are to be installed between Meridian, Miss., and New Orleans, 202 miles, and between Asheville, N. C., and Spartanburg, S. C., 69 miles.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended September 11 amounted to 1,031,081 cars, an increase as compared with the corresponding week of last year of 55,582 cars and a decrease as compared with 1924 of 30,700 cars. The week this year, however, included the Labor Day holiday, which was not included in the 1924 week. As compared with the preceding week, in which a new record of 1,151,346 cars was set, this represented a reduction of 120,265 cars, but the million-car mark was exceeded in spite of the holiday and this was the sixteenth million-car week this year.

All districts except the Southern reported increases as compared with the corresponding week of last year, as did all classes of commodities except grain and grain products. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING, WEEK ENDED SEPTEMBER 11, 1926.

Districts	1926	1925	1924
Eastern	229,968	209,651	240,850
Allegheny	207,912	190,458	210,857
Pocahontas	58,441	55,418	49,280
Southern	148,706	151,684	148,684
Northwestern	162,153	150,219	160,423
Central Western	147,503	141,918	176,097
Southwestern	76,398	76,151	75,590
Total Western Districts	386,054	368,288	412,110
Total all roads	1,031,081	975,449	1,061,781
Commodities			
Grain and grain products	42,902	45,063	66,229
Live stock	34,699	28,730	38,794
Coal	182,233	157,493	182,800
Coke	11,909	10,946	8,291
Forest products	67,217	64,722	69,833
Ore	73,809	54,608	47,834
Misc. L. C. L.	241,172	238,016	254,305
Miscellaneous	377,140	375,921	393,695
September 11	1,031,081	975,499	1,061,781
September 4	1,151,346	1,102,785	921,303
August 28	1,136,233	1,124,438	1,020,809
August 21	1,088,791	1,079,995	982,760
August 14	1,109,557	1,064,476	953,408
Cumulative total, 37 weeks	36,881,938	35,673,292	33,537,142

The freight car surplus for the week ended September 8 averaged 141,096 cars, including 33,039 coal cars and 76,629 box cars. This represented a decrease of 20,382 cars as compared with the last week in August.

Car Loading in Canada

Revenue car loading at stations in Canada during the week ended September 11 were affected by the Labor Day holiday, loadings in the eastern division showing a reduction of 4,862 cars and in the western division 1,204 cars. There was a considerable decrease, too, from the same week last year.

	Total for Canada			Cumulative totals to date	
	Sept. 11, 1926	Sept. 4, 1926	Sept 12, 1925	1926	1925
Commodities					
Grain and grain products	9,617	8,755	14,870	234,078	213,481
Live stock	2,229	2,361	2,578	73,100	80,730
Coal	6,765	7,010	5,509	191,764	121,214
Coke	342	227	325	13,003	9,864
Lumber	3,288	3,813	3,505	131,336	129,003
Pulpwood	1,979	1,894	1,932	102,201	98,995
Pulp and paper	1,854	2,141	1,714	86,976	73,053
Other forest products	2,245	2,748	2,202	112,399	102,390
Ore	2,171	2,094	1,228	60,880	48,766
Merchandise, L. C. L.	15,313	18,250	14,646	581,348	546,712
Miscellaneous	14,372	16,948	14,093	500,111	441,750
Total cars loaded	60,175	66,241	62,602	2,087,196	1,865,958
Total cars received from connections	34,865	38,323	29,707	1,334,182	1,192,481

Consolidation of Accounting Departments Saves Money

C. M. & St. P. stenographers, typists and comptometer operators increase output when segregated

UNDER the direction of W. W. K. Sparrow, chief financial and accounting officer, stenographers, typists and comptometer operators, formerly comprising individual bureaus in the offices of the freight auditor, the ticket auditor, the car accountant, the auditor of expenditure, the statistician, the auditor of investment and joint facility accounts, the auditor of station accounts, and the auditor of overcharge claims, have been consolidated into two units known as the central typing bureau and the central computing bureau. These two units or bureaus are located in an office on the fourth floor of the Fullerton Avenue general office building, remote from any of the other offices, the central computing bureau is on the east side of the building, and the central typing bureau on the west side, facing in opposite directions so that all of the employees of both bureaus receive full benefit of all of the lighting facilities.

All Comptometer Operators Located on East Side of Room

Previous to the consolidation of the smaller bureaus in the individual offices in the one central typing bureau and the one central computing bureau, an investigation of existing conditions brought to light the necessity for a closer co-ordination of the employees in the different offices assigned to the mechanical or common work in all of these offices. It was found that in every office there were slack periods at different intervals during the month, and a rush of work at the end of every month which, in a large number of cases, required the working of the employees overtime at a very considerable expense. The slack periods in the different offices came at different times and while some of the departments were greatly in arrears in getting out the work for that particular department, other departments were up to date and using their computing and typing forces for work other than that to which they were assigned. In the case of emergency work where a large number of operators were required, it was necessary for the bureau to which the emergency job was assigned to work overtime due to the fact that other operators in the building were not trained in the particular class of work involved. Due to the smallness of the units in the different accounting offices there was little or no chance for promotion in the ranks of the operators and there was a very considerable labor turn-over among these employees.

All of the disadvantages mentioned above by the consolidation of the different bureaus into the central typing

and central computing bureaus have now been eliminated and set aside from an actual payroll reduction of thirteen employes with a consequential saving in the payroll of $2,000 per month, many advantages have been obtained through the consolidations. The two bureaus, upon consolidation, were placed under the direction of a competent bureau head or supervisor, particularly trained in the class of work to be assigned to the department in question.

As far as possible, with certain adjustments in salary, the employees in the two bureaus have been graded according to their ability, their length of service, and the class of service on which they are regularly engaged. Under this method, there being 100 operators in the central computing bureau and 72 operators in the central typing bureau, the opportunity for promotion and advancement has been materially increased, and by training the employees for the higher paid positions as they open up, the labor turn-over has been reduced to practically nothing.

The employees are located in a well lighted, well aired, up-to-date office with up-to-date equipment, and are individually more satisfied and pleased with their surroundings than they were when located in the individual offices. This has shown a very material bearing on increased efficiency. The bureaus handle all the work in the Fullerton Avenue general offices where there are 1,500 officers and employees, with the exception of the secretarial work performed by the secretaries to the individual officers. Approximately 90 per cent of the letters written are dictated on dictating machines located in the different offices, the cylinders being sent to the central typing bureau for transcribing. In an emergency, such as the absence of a private secretary of one of the officers, or in the case of special work to be handled quickly, the central typing bureau furnishes a stenographer, upon the request of the officer in charge of the department requiring the stenographer's services.

Work consigned to the bureau is sent to the respective supervisors by messengers and is returned hourly as completed by messengers from each bureau. Under this method the person for whom the computing or typing work is being done seldom, if ever, comes in contact with the operator or stenographer. In both the central computing bureau and the central typing bureau groups of girls are permanently assigned to the work of each department. One of these girls, in the capacity of assistant bureau head, is in charge of the group and oversees the work of the others so that the work the sub-department is engaged on is completed on schedule. This responsibility of the sub-bureau head is in addition to her regular work. When the work of one sub-bureau exceeds the capacity of its employees, the supervisor turns the excess over to any group that may be short of work at that particular time. Special rush work is divided among several employees and in such a manner as not to interfere with the regular work.

All work for the bureaus is accompanied by special forms which contain instructions showing the nature of the work to be performed and the date upon which the work should be completed. Both of the bureaus have a chart showing a description of all of the regular work, the date on which it is due in their respective bureaus, and the date on which it should be completed. In the event that the work is not received on the specified date the forwarding office is immediately asked for an explanation as to why the assigned work has not been forthcoming. Upon receipt of the work to be performed in the bureau, the supervisor and the assistant supervisor assign the work to the operators who, upon completion, return it to the supervisor, who returns it to the department from which it originated. However, in the central computing bureau, when there is typing work involved, it is then sent to the supervisor of the typing bureau, who assigns the work to typists who complete such typing as has been designated on the instruction forms. The completed manuscript is then returned to the originating department.

On straight dictation work for the central typing bureau, only the necessary dictation is put on the cylinders, the name and address of the person to whom the letter is to be sent, the file numbers, the class of paper and the number of copies desired being written on forms which accompany the cylinder. In some instances paragraphs of letters which are used frequently are referred to by number by the dictator and the typist copies these from her standard forms. As far as possible form letters are used in tracing and follow-up letters and are not dictated. In cylinder dictation initials are referred to by numbers running from 1 to 26 so as to simplify dictation and transcribing.

Many advantages have resulted from the consolidation of these two central bureaus other than the saving in payroll previously mentioned. Within 60 days after the formation of the central computing bureau the total arrearage of the several departments, which is an individual case amounted to 90 days, was eliminated without any expenditure for overtime, notwithstanding the fact that there was a reduction of 11 operators and the supervising hours were decreased from 808 to 550, two of the 11 operators devoting part of their time to supervision.

Notwithstanding the decrease in the number of operators in both bureaus it has been found possible not only to get out the current work but to absorb certain assignments of a special nature without overtime, the reason for this being that the operators have been trained in all classes of work and can be shifted to any job. By this practice of training the employees all peak loads and depressions have been eliminated and the work so coordinated that it progresses through the bureau in a regular uniform manner all during the month. The efficiency of the employees in both bureaus has been further increased through the psychology of comparative results, each employee being required to keep a record of the work done each day. A comparison of results encourages the slower employees to increase their output.

In addition to doing more efficient work these two bureaus act as a measure of work done by the several departments, and thereby increases the efficiency of the departments originating the work. The officer in charge of the Fullerton Avenue building, by taking the activities of these two bureaus, has an indicative reflection of the actions and practices of the various offices in the building. A short investigation in either bureau will furnish to that officer an insight of what is going on in all of the offices, and a review of the correspondence being transcribed will, in many instances, disclose matters on which action should be taken, such as complaints from the public or other railroads in connection with work from the various offices.

During 1925, as well as 1926, special work was performed in these two bureaus at a saving which can hardly be reckoned in dollars and cents. A considerable amount of work was performed on reports used in the Interstate Commerce Commission investigation of western freight rates. An almost inconceivable amount of work was performed in connection with all phases of the receivership of this railroad. Since March 18, 1925, it has been necessary to keep a double set of accounts, divided as between corporate and receiver, with a resultant doubling up of the reports and statements to be com-

puted and typed. No addition was made to the force of these bureaus for that reason.

An incident illustrating the superior efficiency of these two bureaus occurred several months ago in the preparation of a comparative statement of passenger train earnings covering a period of two years. The emergency which called for the completion of the statement in ten days was met without disturbing the schedule of the regular work, although the preparation of the statement under the old system would have required 30 days. Another example of the efficiency of the bureaus is shown in the handling of the conductors' wheel reports. In 1924, 798 cars per hour were computed with arrearages resulting, while at the present time an average of 1,558 cars per hour are handled in the bureau without overtime, which is an increase in efficiency of 93 2/3 per cent.

A striking example of the efficiency of these two bureaus is found in the handling of payrolls and paychecks. All payrolls for the entire system, covering between 55,000 and 60,000 employees are sent to the Fullerton Avenue general office building at Chicago for the auditing of the payrolls and the typing and return of the checks to the paycheck delivery points. All of these payrolls are audited in the central computing bureau, the payrolls then being passed direct to the central typing bureau for the typing of the checks. All of this work is handled on schedule as there is only a seven-day spread between the time that the payrolls are received and the time that the checks must be started back for delivery, and even with the handicap of a five-day lapse of time in the forwarding of the payrolls and the return of the checks to the Pacific Coast, at no time has there been a failure to pay the employee on the specified pay day. This work is handled on a semi-monthly basis and every operator in the two bureaus is equally competent to handle any phase of the work. The efficiency of the two bureaus in the handling of these payrolls and paychecks is such that any delay caused either by failure to receive the payrolls on the scheduled date, on account of holidays, or any other reason, is met promptly and handled by the two bureaus so that the finished product goes out on the specified date.

A further advantage resulting from the consolidation in the central typing bureau is the marked decrease in the cost of correspondence and other work handled in this bureau, although there has been a very considerable amount of increased work absorbed by this bureau without any appropriation for additional help. Other offices, on account of increased work, have required additional clerical forces, with the result that increased work necessarily had to be handled by the central typing bureau, but in no instance has there been an appropriation for additional help in this bureau. The records maintained in this bureau indicate that previous to the consolidation the cost of typing was $0.46 per hundred lines and $0.05 per letter, whereas in the corresponding month after the consolidation the cost has been reduced to $0.43 per hundred lines and $0.04 per letter. The cost of transcribing cylinders was reduced from $0.39 to $0.36 per cylinder, and the output for the entire number of dictaphone operators was increased from 1,300 to 2,000 letters per day. A considerable waste in stationery has been eliminated, since the letters formerly typed and thrown away are now examined and checked by the supervisor, and the employee at fault, whether it be the dictator or the typist, is notified so that the cause of the error is removed. As a result of this practice, the records indicate that stationery used during one month previous to the consolidation included 16,000 sheets for company correspondence, 35,000 sheets for inter-office correspondence and 49,000 sheets for file copies, while in a similar month after consolidation, with a heavy increase in work, the numbers of sheets used were 14,000, 18,000 and 46,000 respectively. The number of cylinders used in the central typing bureau in the first month of the consolidation was 450, whereas in the second month, even with increased work, this number has been reduced to 200. These results have been accomplished by close supervision, the training of the operators and a careful methodical inspection of the machine equipment.

The dictators and the operators as well have been schooled in a course of instruction, and it was found that by permanently assigning a dictaphone operator as far as possible to transcribing the work of one dictator the transcribing machine could be adjusted to the dictator's voice, the operator made familiar with specific dictation, and as a result, the average output of all of the dictaphone operators has been increased from 600 lines per day before the consolidation to over 1,000 lines per day at the present time, at the same time the dictator has increased his average output from 40 lines per cylinder to 100 lines per cylinder.

Smaller type machines have been adopted, resulting in more lines per sheet, with a corresponding saving in the amount of stationery used. With the development of the efficiencies previously mentioned, an improved method of making stencils for mimeograph work has been adopted. Under the old method stencils were made entirely on typewriters, while under the new method only the typing is done on the typewriter, the ruling being done by hand with special ruling tools. A special machine is used for this ruling process which is done before the stencil is typed, with the result that the number of mimeograph copies per stencil has been increased from 10,000 to 25,000.

The schedule maintained in the central typing bureau, as well as the schedule maintained in the central computing bureau, not only automatically keeps these bureaus up to the minute on current work, but also eliminates any intermittent work on the part of the reporting offices for the reason that the schedule maintained in the central bureaus places the other offices on a daily production plan, which schedule must be maintained by all concerned. The ability of the central typing bureau, as well as the central computing bureau, to absorb work is further exemplified by the fact that recently it was necessary to re-type 200 contracts for one of the accounting offices, each contract consisting of from 15 to 20 sheets, seven copies to be made, and this work, by proper distribution in the central typing bureau, was absorbed without any detriment to the daily work.

In the central computing bureau this year the annual inventories for the commissary department, the department of track elevation and department of telephone and telegraph were extended and computed, whereas in previous years this work was done in the individual offices by employing outside help.

This increase in efficiency, with a resultant decrease in cost in both bureaus, has been brought about largely by the interest and supervision of the two bureau heads, the training and education of the individual operators, and the schooling and instruction of officers and employees in other departments as to the requirements and needs of the central bureaus as well as in the co-operation in the handling and the distribution of the work.

One of the secrets of the success of these bureaus is the fact that employees from other offices are not permitted to come in contact or to issue any instructions to the individual operators. Any questions in connection with the work, such as preference in the matter of emergency assignments, are handled direct by the officers of

other departments with Wm. Kruckstein, ticket auditor, under whose immediate jurisdiction these two bureaus function. While it has been stated previously that the actual payroll saving amounted to $2,000 per month, there has been a saving that would be very hard to measure in dollars and cents. The officers in the Fullerton Avenue general office building have been relieved from a great deal of worry and responsibility insofar as their individual offices are concerned, and the operators in these two bureaus themselves have been relieved from the constant strain existing prior to the consolidation. An even distribution and handling of the work in a manner so as not to overtax any one individual or operator has brought this about.

New York Central Electric Freight Locomotive Tested

ROAD service tests were made September 19 of a 170-ton electric freight locomotive which was delivered recently to the New York Central. It is one of an order of nine placed late in 1924, which included seven 100-ton switching locomotives and two 170-ton freight locomotives; these were described in the *Railway Age* of January 17, 1925. The freight locomotives consists of two articulated units, each one of which has a cab and two four-wheel trucks. Specifications required that the locomotives be capable of hauling a 3,000-ton train at 32 miles an hour and have a safe running speed of 60 miles an hour.

The test made on the 19th included three round trips between Harmon, N. Y., and High Bridge, N. Y., with a train made up of 100 cars weighing 3,006 tons. The total distance run was 144 miles. The train was made up of both loaded and empty cars and had three cabooses. One of these, coupled directly behind the locomotive, was equipped for measuring motor temperatures, voltage, current, power, efficiency and speed. The other cabooses carried engineers who watched the test and checked locomotive performance.

Three methods of measuring motor temperatures were used. These consisted of applying thermometers to the motors, of measuring the resistance of the motor windings and of determining the temperature by means of special exploring coils placed in the armature slots and connected through slip rings to meters in the caboose. Temperatures by the first two methods were taken at the beginning and end of each run while temperatures by the exploring coil method were taken at regular intervals throughout the test. The tests showed that the locomotive was able to haul the specified tonnage without injurious heating. Previous tests made on the General Electric test track at Erie, Pa., showed that the locomotive could be operated safely at speeds above 60 miles an hour. The two freight locomotives will be used on the West Side freight tracks in New York City and their operation will probably be limited to the part of the line north of 72nd St.

H. A. Currie, assistant electrical engineer, New York Central was in charge of the tests and was assisted by J. T. Seaver, assistant engineer, electrical engineering division; J. A. Carmody, superintendent of electrical equipment. and a crew of 24 of the electrical staff.

The locomotive, general dimensions of which are given in the table, was purchased from the American Locomotive Company, equipped with electrical apparatus furnished by the General Electric Company.

GENERAL DIMENSIONS AND SPECIFICATIONS FOR NEW YORK CENTRAL ROAD FREIGHT LOCOMOTIVE

Wheel arrangement	0440-0440
Weight (All on drivers)	170 tons
Weight per axle	425,000 tons
Length, coupled inside knuckles	68 ft. 2 in.
Wheelbase, total	55 ft. 3 in.
Wheelbase, each unit	24 ft. 3 in.
Wheelbase, truck	8 ft. 3 in.
Width, over all	9 ft. 11½ in.
Height, trolley locked down	14 ft. 7 in.
Wheel diameter	44 in.
Curvature track (min.)	230 ft.
Locomotive to haul 3,000 tons at	32 m.p.h.
Maximum safe speed	60 m.p.h.
Ratings (blown, 120 deg., C-600 volt)	
Continuous T. E. locomotive	Speed
41,600 lb.	24 m.p.h.
28,400 lb.	35 m.p.h.
56,000 lb.	22 m.p.h.
Tractive effort at 30 per cent adhesion	102,000 lb.

New York Central Type R Electric Freight Locomotive Hauling 3,000-Ton Test Train

Roadmasters Hold 44th Convention

Papers by higher railway officers form important feature of meeting held in Chicago this week

FOR the fifteenth time in its history, the Roadmasters' and Maintenance of Way Association held its annual meeting in Chicago during the past week, this being the forty-fourth annual convention of this organization. The program, which occupied three morning sessions, two afternoon sessions and two evening meetings beginning at 10 a. m. on Tuesday and ending on Thursday noon, was divided about equally between the reports of committees, and papers and addresses by railway officers.

More than 350 roadmasters and engineers were present, exceeding the attendance of any previous year. G. W. Morrow, president of the association and formerly supervisor of track on the New York, New Haven & Hartford, presided at the various sessions.

Thomas H. Carrow, supervisor of safety, Pennsylvania, and chairman of the Safety Section, American Railway Association, delivered an inspiring address on Safety in the Maintenance of Way Department, presenting some convincing statistics to show the need of concerted attention to this subject by the roadmaster and track supervisor. Another phase of the human problem was presented by J. S. Hyatt, general manager of the Chicago, North Shore & Milwaukee, who described methods pursued by that property in building the morale of the maintenance of way department. Matters of a more technical nature were discussed by H. J. Pfeifer, chief engineer of the Terminal Railroad Association of St. Louis, and John Foley, forester of the Pennsylvania, Philadelphia, Pa. Mr. Pfeifer read a paper on the Effect of Modern Locomotives on the Length of Turnouts, and Mr. Foley made an appeal for greater attention by the track officer to the quality and grade of ties. It was the burden of his remarks that responsibility for the procuring of good cross-ties could not be placed entirely on the purchasing department. On Tuesday evening, J. V. Neubert, engineer maintenance of way of the New York Central, lines east, presented an illustrated address on Our Modern Track Construction and its Development. On Wednesday evening, C. A. Morse, chief engineer of the Chicago, Rock Island & Pacific, was the principal speaker at the annual dinner of the Roadmasters' and the Track Supply associations. Under the title, "Placing the Track Department on a Business Basis," Mr. Morse offered some pertinent suggestions for increased efficiency in the maintenance of way department which were addressed as much to the managements of the railroads as to the officers in charge of maintenance work.

The committee reports comprised discussions of current problems and more recent developments in track maintenance, among which the report on Track Joints and Their Maintenance and the report on Track Tools deserve especial commendation. The report on the Re-arrangement of Track Work to Promote Uniform Forces Throughout the Year was supplemented by a paper by Lem Adams, roadway assistant, president's staff, Union Pacific System, Omaha, Neb. Abstracts of the committee reports and the various papers presented at the convention appear herewith on following pages.

The meeting was opened on Tuesday morning with an address by R. H. Aishton, president of the American Railway Association, followed by a response by G. W. Morrow, president of the Roadmasters' Association. Mr. Aishton's remarks are abstracted below.

R. H. Aishton Addresses Convention

In considering some of your problems let us take first, for instance, the growth of the load on the roadbed —not concentrated axle loads, but the total tonnage handled over the railroads and the great increase during the past five years. In 1921 the average in this country was 9,530 gross ton-miles per mile of main track per day. During the first six months of this year it was 11,756 gross ton-miles. Making allowance for the heavier traffic during the second half of this year, there will be this year, compared with 1921, an increase of more than 30 per cent of the load per day that the track you build and maintain has to carry.

During the year 1925, the railroads purchased for their tracks 2,179,201 gross tons of steel rails and 21,672,754 cu. yd. of all kinds of ballast (not including the ballast hauled from their own gravel pits, quarries, or power plants). Now these figures don't mean anything to the ordinary mind, but to illustrate the ballast item above, picture a pile of ballast that is 840 ft. long, 840 ft. wide, and 840 ft. high.

The past year has seen some outstanding accomplishments in maintenance. The adoption of the 39-ft. standard steel rail should and will be far reaching in its effects in producing economy. The new method of conserving the rails, the recommendations as to the canting of rails by the A. R. E. A.; the increasing use of preservatives in the treatment of ties; these are all outstanding things. These are all improvements over what was done before and the whole growth is towards better maintenance.

What are your problems? I believe the future development of the next few years lies in the development of labor saving devices and equipment. This is so in every other industry and is bound to be so, and is so, in the railroad industry, and with the development along these lines come better methods of doing the work, more economical methods of doing it and, above all, brings about a stabilization of employment which has not existed in the past.

Now consider your interest in all of the problems of the railways, for we haven't the same problems we had a few years ago. The great problem then was whether the railroads were going to be able to continue under private management, but you don't hear much about that question these days. You are, however, hearing continually about the future of waterways, motor trucks, motor buses and even of airplane transportation in competition with the railways. What is the answer to all these things? Why, the answer as I see it, is to be continually more efficient, to continually

render more and more adequate service to the public and to render such service at the lowest possible cost that can be produced through your efforts and ingenuities. If these things are done you need not fear the future of the railways, for in the hands of you men and those under your supervision lies, in part at least and no small part, the answer to these questions. If you do your part and do it well, public opinion and appreciation of the patrons of the railroads will do the rest.

One other word of advice to your organization. You discuss a lot of matters here, your committees give a great deal of time and thought to these matters, they have reached conclusions and formed recommendations. You discuss them here and you vote on them, and probably vote unanimously on most of the things. Don't go away and forget them, for here your work has only begun; you have got to make them effective. If you believe they are good things and if they are in line of more efficiency and adequate transportation or greater economy don't drop them after leaving here but do everything to sell them to your own organizations and sell them to yourself, if necessary.

Following Mr. Aishton's address, President Morrow called the attention of the convention to the program, pointing out that benefits could be derived from the efforts of the various committees and those who had prepared papers, for the meetings depended in a large measure on the extent to which the individual members of the association participated in the discussion. He also asked members to avail themselves of the facilities afforded by the Track Supply Association for a detailed examination of the various exhibits of track devices and equipment on display.

Accidents to Maintenance of Way Employees

By Thomas N. Carrow

Supervisor of Safety, Insurance Department, Pennsylvania Railroad; Chairman, Safety Section, American Railway Association

Out of a total of 400,000 employees in the maintenance of way department on Class 1 railroads 428 were killed and 26,011 were injured in 1924, representing 31 per cent of all accidental deaths and 22 per cent of all injuries to employees. It is therefore apparent that the maintenance of way department, particularly the roadmasters' association, should contribute a large share toward the 35 per cent reduction in railroad casualties by 1930, the goal established by the safety section of the American Railway Association at its annual meeting in 1923.

Injuries to maintenance of way employees, as reported to the Interstate Commerce Commission and the hours worked in 1924 on the Class 1 roads, are classified by occupations in Table I (1924 is the last year for which figures are available).

TABLE I—INJURIES TO MAINTENANCE OF WAY EMPLOYEES

Occupations	Killed	Injured	Total man-hours	Casualties per million man-hours: Killed	Casualties per million man-hours: Injured
1. Roadmasters and general foremen	4	50	8,516,000	0.47	5.87
2. Assistant general foremen	..	8	852,000	....	9.39
3. Supervising maintenance of way inspectors and scale inspectors	..	8	810,000	....	9.88
4. Maintenance of way inspectors	..	26	1,630,000	....	15.95
5. Bridge and building gang foremen (skilled labor) (1)	9	134	13,498,000	0.67	9.93
6. Bridge and building carpenters (7)	24	2,447	54,743,000	0.44	44.70
7. Bridge and building ironworkers	1	111	2,456,000	0.41	45.20
8. Bridge and building painters (1)	5	171	5,913,000	0.85	28.92
9. Masons, bricklayers, plasterers and plumbers	..	134	5,385,000	....	24.88
10. Skilled trades helpers (2)	9	637	24,351,000	0.37	26.16
11. Regular apprentices	..	43	285,000	....	150.88
12. Portable steam equipment operators (2)	6	144	6,101,000	0.98	23.60
13. Portable steam equipment operator helpers	2	71	2,353,000	0.85	30.17
14. Pumping equipment operators	4	126	17,698,000	0.23	7.12
15. Gang foremen (extra and work-train laborers) (2)	3	114	10,098,000	0.30	11.29
16. Gang foremen (bridge and building, signal and telegraph laborers)	1	92	1,605,000	0.62	57.32
17. Gang or section foremen (18)	30	965	102,289,000	0.29	9.43
18. Laborers (extra gang and work-train) (18)	54	3,105	139,895,000	0.39	22.20
19. Track and roadway section laborers (153)	233	15,706	495,860,000	0.47	31.67
20. Maintenance of way laborers (other than track and roadway) and gardeners and farmers (6)	18	878	19,824,000	0.91	44.29
21. General foremen and supervising inspectors (signal, telegraph and electrical transmission)	2	7	1,267,000	1.58	5.52
22. Assistant general foremen (signal, telegraph and electrical transmission) and signal and telegraph inspectors (1)	1	12	1,508,000	0.66	7.96
23. Gang foremen (signal and telegraph skilled trades labor) (1)	1	25	3,167,000	0.32	7.89
24. Signalmen and signal maintainers (1)	5	380	20,896,000	0.24	18.19
25. Linemen and groundmen	9	259	6,551,000	1.37	39.54
26. Assistant signalmen and assistant signal maintainers	2	124	6,280,000	0.32	19.75
27. Signalman and signal maintainer helpers (5)	5	234	7,553,000	0.66	30.98
Total (218)	428	26,011	961,384,000	0.45	27.06
Total all classes of employees	1,403	120,912	4,472,049,000	0.31	27.04

Note: Figures in parenthesis include the number struck and killed by trains, which make up one-half of all fatal accidents to maintenance of way men.

Three hundred and twenty-nine, or 77 per cent of the total number of maintenance of way employees killed and 22,136, or 85 per cent of those injured, were carpenters and laborers. It is therefore apparent that the greatest amount of effort to prevent accidents must be directed toward these two occupations.

Causes

The majority of the injuries to maintenance of way employees occur while handling rails, ties, lumber, timber and other material; handling and using hand tools; working on telegraph and telephone lines; operating hand and motor cars and in connection with the movement of trains as is shown by the classification of injuries by detailed causes given in Table II.

TABLE II—CAUSES OF MAINTENANCE OF WAY ACCIDENTS—1925
Includes All Accidents of One Day's Disability or More.

	Estimated Injured
1. Lifting, handling, loading and unloading material and using hand tools, etc.—strain, wrench, sprain or rupture	2,070*
2. Lifting, handling, loading or unloading material—failed to take hold or let go in unison	190*
3. Ties and timber—lifting, handling, loading and unloading with unloader, derrick, etc.	90*
4. Ties and timber—lifting, handling, loading and unloading by hand	3,320*
5. Rails and frogs—lifting, handling, loading and unloading with unloader, derrick, etc.	440*
6. Rails and frogs—lifting, handling, loading and unloading by hand	3,790*

	Estimated Injured
7. Other material—lifting, handling, loading and unloading with unloader, derrick, etc.	170*
8. Other material—lifting, handling, loading and unloading by hand	1,370*
9. Accidents in connection with use of jacks	700*
10. Spike drawer or bar slipping off spike, catching hands, etc.	1,100*
11. Driving spikes—spike flying up, etc.	460*
12. Struck by tools or materials in hands of fellow employees	660*
13. Hammer, sledge or other tool glancing or missing object	570*
14. Cut by adz or other edged tools	390*
15. Spalls flying off hammer, sledge, tool heads, etc. (including nut heads)	1,640*
16. Other accidents in connection with the use of hand tools	1,360*
17. Tamping ties—dirt or stone flying up	430*
18. Splinters or nails in hands or feet, etc.	570*
19. Poles, telegraph, telephone, electric light, etc., working on or around	290*
20. Slipping and falling on tracks, platforms, steps, ice, snow and from bridges, coal wharves, etc.	4,840*
21. Scaffold falling or giving way or falling off scaffold	110*
22. Ladders, falling or breaking or giving way or falling off ladder	100*
23. Opening or closing drop doors on cars—wrench slipped, etc.	160*
24. Poisoned by creosote	290*
25. Autos, teams, etc., colliding with crossing gates	20*
26. Struck or run over by locomotives or cars (I. C. C. 1924 figures) 218 killed	258
27. Hand cars or motor cars struck by trains (I. C. C. 1924 figures) 34 killed	90
28. M. W. & S. hand cars (non-train accidents only) (I. C. C. figures) 7 killed	1,069
29. M. W. & S. motor cars (non-train accidents only) (I. C. C. figures) 62 killed	3,341
(Causes 28 and 29 include derailments, men falling off, tools falling off, lifting, placing and starting, etc.)	
Total (includes miscellaneous accidents—not shown)	30,000*

Note: (*) Not possible to estimate accurately the number killed due to the respective causes.

With the foregoing classification of injuries to maintenance of way department employees by occupations and detailed causes it is possible to develop certain principles of accident prevention practicable of application under the varying conditions of work.

What Is Safety?

What is safety? The dictionary says "freedom from danger," but that meaning is not applicable to railroad safety, because you can't be absolutely free from danger on a railroad, although it is possible to be safe under even the most hazardous conditions. Therefore, in place of "freedom from danger" I would substitute "mastery of danger" as an appropriate definition of safety.

Mastery in the sense that it is here used means the development of a state of mind in which the precautions necessary to insure personal safety are automatic and constant. That thought is embodied in St. Paul's admonition, "Let him that thinketh he standeth take heed lest he fall."

Discussion

The active discussion of this paper demonstrated the keen interest that roadmasters are taking in the reduction of accidents among their men. While recognizing that the heavy turnover is productive of accidents, the possibility of more general education regarding the conditions attributing to accidents was emphasized. P. J. McAndrews (C. & N. W.) described the practice of his road of circularizing all foremen every month to bring to their attention the causes contributing to accidents during the preceding period. Each roadmaster is also furnished with a statement showing the comparative rating of all roadmasters on the system from the standpoint of accidents. D. O'Hern (E. J. & E.) described the annual 14-day safety drive on that road which served to keep the safety subject before employees. W. A. Davidson (U. P.) stated that in the last three months the safety agent on each division of that road had talked to every employee monthly on safety subjects, as a result of which there was not a single reportable injury on the Nebraska division during August. C. Feucht (U. P.) stated that particular attention is given to the operation of motor cars, as a result of which there has not been a motor car accident on his sub-division for four years.

The Construction and Maintenance of Highway Crossings and Their Approaches

Report of Committee

No development in the industrial world has been thrust upon us more rapidly than the transition from horse-drawn to motor-drawn vehicles. Motor vehicles have come to stay and to perform helpful and indispensable services. Their tremendous growth makes it necessary to maintain railroad crossings and their approaches at a higher standard, not alone to promote comfort in travel but to aid in the reduction of accidents at these crossings.

Two of these problems and doubtlessly the major ones are the construction of grade crossings and of their approaches with reasonable protection to promote safety. A highway crossing that will handle the heavy vehicular traffic, often running as high as 20,000 vehicles per day, and which can be repaired quickly and cheaply without the necessity of complete renewal, is the most practical crossing. The surface material must be elastic and resilient enough to absorb the impact and vibration without becoming permanently impaired. Equally important, the priority of right for the movement of trains over crossings as compared with pedestrian and vehicular traffic, implies an equal obligation on the railroad to provide suitable signs and protection. These problems call for united study and action by highway and railroad officers of the United States and Canada. The diversity of efforts of different states with the same object in view, but through entirely different methods, results only in confusion. Standardization of methods and practices should be obtained.

As to the construction and maintenance, crossings and approaches should have a width as well as an ease of approach that will not limit traffic on the highway. There are many methods of securing the necessary smooth surface, no small proportion of which are practically prohibitive because of their first high cost and subsequent maintenance charges. This condition has led to the development of a type of crossing in which a bitumen or similar compound is utilized. This general type of crossing has been found to give excellent results, being comparatively low in first cost, easy of application under traffic, readily repaired, low in maintenance and smooth in surface.

Bituminous Crossings

The expense resulting from the high maintenance costs of crossings utilizing planks, bricks, etc., has brought into the market a number of bitumens, the more common types of which are those made from:

1. Oil residues.
2. Emulsified asphalts.
3. Coal gas tars.
4. Mineral rock containing asphalt.

All of the above compounds are applied cold, a feature that is very desirable in the maintenance of way department. The methods used in applying mix-

tures No. 1, 2 and 3 are similar and the cost for labor and material is about the same. The No. 4 type is a natural rock which is pulverized by machinery and which contains enough asphalt to solidify when tamped in place.

The maintenance of bituminous crossings is simple, requiring the keeping of a few yards of ½-in. stone and a barrel of oil at some convenient place nearby and out of sight, where the track walkers or crossing watchmen can make repairs readily and easily.

The cost of installing these crossings varies according to the number of train movements, the density of vehicular and pedestrian traffic and the cost of labor and materials in the various localities. Bituminous compounds are now generally used by all of the railroads of this country and Canada, not only in complete renewals but in repairing and rebuilding existing crossings.

We recommend the increased use of bituminous materials to replace the existing crossings of plank, concrete, skeleton, brick, Belgian blocks, rails, etc., believing that the use of bitumens will overcome many of the defects and the high costs of the types mentioned.

These defects may be summarized briefly as follows:

Planks: High first cost and upkeep, danger to equipment, etc.
Concrete: High first cost, cracking, disintegration and difficulty of repair.
Skeleton: Unsuitability for heavy traffic.
Brick: High first cost and maintenance.
Belgian block: High first cost and maintenance.

Conclusions

The committee recommends that exceeding care be taken in the installation of bituminous crossings, particularly along the following lines:

1. Good line and surface of track.
2. Large ties, hardwood and treated, tie plated and fully spiked to prevent looseness and vibration.
3. Elimination of all joints in crossings.
4. Flangeway guards, except in crossings of the lightest traffic.
5. Generous use of bituminous material sufficient for a good binding mixture and an impervious crossing.
6. Provision for good drainage and upkeep.

Safety at Crossings

The program of highway crossings, approaches and their protection will be with us for a long time for the tremendous cost necessary to eliminate them makes this a problem requiring careful thought. There are four elements to be considered: (1) Traffic on the highways, (2) traffic on the railroads, (3) vision of the tracks from the highway, and (4) grade, width and type of surface on approaches.

The conditions at a crossing should be studied by making a survey for a certain period, showing a count by hours of the motor, pedestrian and train movements. Then a vision survey should be made to determine such conditions as the obstruction to view, grades of approaches and the alinement of tracks. With these data before us, there is no reason for snap judgment. This done, one can then decide what kind of protection should be afforded. Protection is of two kinds, manual or stationary, and automatic.

The railroad crossing is identified by various kinds of signs on the right-of-way. In many states an approach sign is located 300 ft. from the tracks. Grade crossings are further protected by watchmen, using metal discs and lights at night. Crossing gates are painted black and white to increase visibility and attract attention, red lights being suspended on the gates at night. Other protection is afforded by wig-wag and flashing signals, operated electrically on the approach of trains.

Different devices are used by various railroads throughout the country, many of which are controlled by track circuits, to operate lights and bells connected to signs. There are so many different kinds of these that tourists become confused or overlook them.

The great need is to bring about a sense of personal responsibility on the part of individual drivers. Pedestrians must do their part and officers must continue to devise better ways and means for enforcing sane and practical regulations. In the meantime simple rules of foresight and precaution apply to the man at the wheel of every motor vehicle as they do to the engineman, with his hand on the throttle.

There has been a feeling in numerous quarters of late that the approaches to crossings on many railroads are not all that they should be. Generally speaking the approaches to grade crossings should be as nearly level as possible, which provision is not so important in the case of an overhead or undergrade bridge. The approaches should not limit traffic on the highway in respect to the number of vehicles or loads and the approach grades in level territory should be entirely different from those in mountainous territory. For instance, one large system generally works to an approach grade not exceeding six per cent in mountainous country, although this of course has to be exceeded in special cases, but in level country, on account of the generally favorable grades on the existing roads, it tries to work to a grade not exceeding four per cent.

The width of approaches in some states is determined by law. In Pennsylvania the law requires a minimum width of 24 ft. on new overhead or undergrade bridges. The importance of the highway should determine the width with some minimum; for instance, a width of 9 ft. should be provided for each line of motor vehicles, and where sidewalks are required a minimum width of 6 ft. is considered good practice. The surface on approaches to grade, overhead and undergrade highway crossings, should generally be paved with a bituminous macadam, except on state roads which are paved with concrete. Where the grade is unusually heavy, the specifications of the state highway departments call for hillside brick on a concrete base.

Conclusions

The recommendations of the committee are:

1. At all important crossings, where train movements and highway traffic are heavy, the flashlight, which is actuated by approaching trains, should be adopted.
2. Where practicable these devices should be placed on a concrete ramp located in the center of the highway, similar to silent policemen. This will cause motor vehicles to slow down before approaching crossings and call their attention to the crossing.
3. On heavily traveled crossings in cities, towns and villages, where watchmen are necessary, a sign to stop and go should be located on a concrete ramp in the center of the highway, operated by the watchman and not connected by a track circuit.
4. A committee of safety agents of different railroads in America and Canada should be appointed to adopt a standard railroad crossing sign, so that shape, coloring and lettering should be exactly the same.
5. The grade of approaches should not exceed that which prevails in the section of the country for highways of the class under consideration. The importance of the highway should determine the width and the surface should be a bituminous macadam on minimum grades and hillside brick with a concrete base on maximum grades.

Committee: A. E. Preble, supervisor, Penna., chairman; F. J. Meyers, assistant engineer, N. Y. O. & W.; A. A. Johnson, supervisor, N. Y. C.; D. C. McGregor, supervisor, B. & O.; E. E. Crowley, supervisor, D. & H.; F. W. Hillman, division engineer, C & N. W.; and G. T. Anderson, general roadmaster, K. C. S.

Discussion

In the discussion of bituminous crossings some members favored the use of a plank or some other form of guard along the outside of the running rail, to pre-

vent a crumbling of the material, while other members secured this result by using a compound containing fibrous matter or by using a richer mixture for this portion of the crossing.

The importance of proper drainage and the sealing of the sub-grade against water by the use of a proper flange way guard was stressed, as was also the elimination of rail joints in the crossing.

The Chicago & North Western, the Chicago & Alton and the Union Pacific reported favorable results from the welding together of the ends of the rails to eliminate the joints.

The Effect of Modern Locomotives On the Length of Turnouts

By H. J. Pfeifer
Chief Engineer, Terminal Railroad Association of St. Louis

In the larger cities, track layouts developed and installed many years ago, some of them very extensive, are built with short turnouts and very sharp curves; it is usually impossible to lengthen the turnouts and ease the curvature, because this involves either a material reduction in capacity or the acquisition of additional land at great and sometimes prohibitive cost, with the necessary readjustment or destruction of expensive buildings and other facilities that have grown up in the vicinity. To fit up and maintain short turnouts and sharp curves, without change in alinement, to meet the requirements of the modern locomotive, is often of vital importance, because it may mean the continued useful life of a facility that might otherwise have to be replaced at great cost.

The St. Louis Union Station is an example of a situation, such as has just been described. There are 32 station tracks, running north and south at approximately right angles to the main lines with which they are connected to the east and west by two three-track throats, making possible six simultaneous moves into and out of the station. An idea of the complexity of the track layout that makes possible all of these connections and parallel moves, is given by the fact that it contains 74 single turnouts, 51 slip switches, and 21 railroad crossings.

The limited distance from the main lines, to the ends of the station tracks makes imperative the use of the sharpest possible curvature to secure tracks of maximum length to hold present day trains. The curvature of the main leads into the station is 16 deg. and the slip switches and turnouts are number sevens. There are a few crossover tracks with a curvature of 20 deg.

Use Tracks Without Restrictions

The tracks are used without restriction, except as to speed by the heaviest and longest passenger locomotives of 18 railroads in hauling about 260 regularly scheduled trains into and out of the station daily. This movement with the necessary switching of empty trains, light engines, etc., keeps the station tracks very busy, particularly at certain hours of the day. Since there is no possibility, short of complete abandonment, of equipping the station track layout with easier curves and longer switches, and locomotives are constantly becoming heavier and longer, it is necessary to maintain the station trackage to a very high standard, so as to handle this heavy movement with expedition and safety. While they are rare, derailments do sometimes occur. A study of them develops the following:

1. Locomotives derail much more frequently than cars.
2. In almost every case the derailment is at a frog, guard rail or railroad crossing while moving around a curve.
3. Very few derailments occur at switch points, or on curved tracks, where there are no frogs and guard rails, and a derailment on an unbroken straight track is almost unknown.

As a result of the close attention given to maintenance of the station trackage, and the application of devices to correct defects exposed by a study of derailments during the past few years, there has been a decided reduction in the number of derailments; in fact, they have been almost entirely eliminated.

Measures to Prevent Derailments

A first requisite for good safe maintenance, particularly in switches and on curves, is a track that will stay put, in other words, one that will maintain its alinement, surface and gage under traffic. This can only be secured on a drained, substantial road-bed, well ballasted with good ties, tie plates and heavy rail. The station tracks, well drained, rock-ballasted with 100-lb. R. B. section rail, laid on sound ties with tie plates 8 in. wide by ¾ in. thick, are being maintained to true alinement, surface and gage at moderate labor cost. Some details of practice that have been found effective and made standard are the following:

As the speed is limited to a maximum of 20 miles per hour, all tracks, regardless of the curvature, are laid without super-elevation. The wear of a curved track invariably depresses the inside rail, therefore, a track laid level to begin with can go longer without attention than one that has had super-elevation built into it.

A gage of 4 ft. 8½ in. is standard, regardless of the rate of curvature, and is being maintained successfully. A detailed examination of the head of a rail that has been laid for some time on the inside of a curve, regardless of the rate of curvature or gage of track, becomes flattened and flows over on the gage side, proving that there is not the least flange wear on the inside rail of a curve. This indicates, and our actual experience has proved that widening of the gage on curves is unnecessary, and adds to the maintenance cost because all curved track becomes widened by wear, and if you begin with a widened gage, earlier regaging becomes necessary.

Since lubrication reduces friction, the daily oiling of the gage side of the outer rail on curves, of switch points, guard rails and frogs has been a practice of about three years' standing. Such a material reduction in wear has been noted as to confirm our belief that this practice is economical and well worth while.

Experience with Frogs

Since practically all derailments occur in turnouts and crossings, their improvement has been studied carefully. Much difficulty has been experienced in keeping railroad crossing frogs and turnout frogs, particularly on curves, in position, there being a decided tendency for them to slide between the spikes; in fact, on some sharp curves it was almost impossible to hold a frog in position. It has been developed that a guard rail, particularly a

long guard rail opposite the guard on a frog and on a curved track, because of a narrow flangeway on each side of the track, restricts the movement of driving wheels held together in the frame of the locomotive to such an extent that without lateral movement of the entire track and alternate slipping in and out of the rail between the spikes a derailment can hardly be avoided.

About five years ago some of the lines entering the Union station began the use of a very long and heavy 4-8-2 type of locomotive, which at first caused so much trouble, while moving through switches on sharp curves, that it was necessary to restrict them to tracks with easier curvature. Very careful tests and studies of these locomotives and of the tracks were made to determine the possibility of using them with safety. It was found that the derailment of one of these locomotives invariably occurred in a back-up movement and that the back driver mounted the guard rail about two feet ahead of the frog point on a sharp curve. It was thought that this might be due to the cramping of the locomotive driving wheels between the guard rail and the guard on the frog, and as an experiment, a few self-guarded frogs were installed and the guard rails were removed. It was seen immediately that the movement of these locomotives was much freer and that there was no further difficulty in keeping the frog in its position. Since that time practically the entire station layout, including crossing frogs up to 28 deg. angles, has been equipped with solid cast manganese steel self-guarded frogs and these locomotives and others just as long and heavy have been moving in and out of the station unrestricted and without derailment ever since. Because of our satisfactory experience with the self-guarded frog, from the standpoint of safety and economical maintenance, it has been made standard on the entire terminal for all but high speed tracks.

Finally, the safe maintenance of sharp curves and short turnouts under long and heavy locomotives cannot be secured without careful and competent supervision, capable foremen and expert trackmen to discover and correct irregularities before they become too bad and cause trouble.

Discussion

Comments made from the floor following the reading of this paper were almost entirely in the nature of endorsements of two of the conclusions presented, namely, that derailments can be greatly reduced by avoiding super-elevation and wide gage on curves. Several speakers reported favorable results with the elimination of guard rails at frogs by the use of flanged frogs.

Track Joints and Their Maintenance

Report of Committee

The purpose of a track joint is to hold the ends of two adjoining rails together and in line and surface. Because of the forces acting upon the joint it is necessary that a rail joint have sufficient strength in both the top and bottom parts of the joint to prevent breaking, due to the stresses in either direction. The joint must also have sufficient bearing on both the underside of the head of the rail and the upper side of the base of the rail to transmit the stresses properly between the rail and the joints without undue wear.

Joints which fit between the head and the base of the rail should be so made as to leave enough clearance between the joint bar and the web of the rail to provide for taking up the wear of the contact faces by tightening up the bolts, thus drawing the joints into proper contact again. Joint bars should be so designed that they will keep the tops or faces of adjoining rails as near the same level as possible.

The use of any type of joint which has a base plate or a supporting section which projects underneath the base of the rail, brings all the difference in the height of the two adjoining rails to the top, resulting in a tendency for the top of the higher rail to flow over onto the lower rail, or into the opening between the rails and thus become the cause of a chipped or battered end rail.

The use of a joint which fits between the head and the base of the rail only and does not have any connecting portion under the rail, results in lining up the two rails on the top line of the joint bar, and only the difference in the thickness, or depth, of the rail heads comes to the top, thus making much less difference in the level of the tops of the rails.

The most efficient rail joint would seem to be one which:

1. Presents a good bearing surface to the underside of the head, and to the upper side of the base of the rail.
2. Has sufficient clearance from the web of the rail to permit the continued fit of the joint, in the fishing space of the rail, until a considerable amount of wear has taken place.
3. Has sufficient metal properly distributed above and below the neutral axis to take care of the forces acting upward as well as of those acting downward.
4. Produces the greatest strength in proportion to the amount of metal used.

The Length of Track Joints

The study of the rail and joint and of the forces acting upon them, indicates that a joint long enough to cover three ties, with the ties so spaced that one of them is directly under the rail ends, increased the number of ties which are bearing the load directly with a consequent decrease in the tie forces acting against the rail at each tie. Experience gained from the actual use of joint bars long enough to span three ties and fastened with six bolts, indicate that they give results superior to the shorter joints fastened with four bolts, but whether they have sufficient advantage over the shorter bars to justify their greater cost, is not proven beyond a doubt.

Ties of uniform size, and of as near an average of all the ties used, should be selected for use as joint ties. If rail anchors are used opposite the joints, care should be taken to so place the tie plates that the anchors will not make contact with the plates, as rail anchors bearing against any tie plate throw the anchorage against the spike and produce all of the bad effects of slot spiking.

The Kind of Bolts and Springs

Following the selection of a type of joint comes the question of the kind of bolts and kind of spring washers or spring plates, if either are to be used. Prior to 1912 loose bolts in rail joints were a common occurrence and called for a large amount of maintenance work to keep them tight. From an experiment made for another purpose it was discovered that most loose joints were due to the stretch and wear of the low carbon steel or iron bolts then generally used, and that the nuts on track bolts very rarely backed up, or unscrewed.

Following the discovery of the causes of loose joints,

alloy steel bolts were offered for track use, followed soon after by heat-treated high carbon steel bolts. Prior to the introduction of these high strength bolts it was impossible to bolt up a joint too tightly because the bolts would stretch before that condition was reached.

The much greater strength of the improved bolts has resulted in many rail joints being bolted up so tightly that the rail cannot slip through them to take care of the expansion and contraction of the steel due to changes in temperature. On this account it is important that some form of spring washer or spring plate be used on joint bolts. Some roads are reporting good success with each type of springs but it is possible to get joints bolted too tightly, even where springs are used.

The Installation of Joints

An important factor in the efficiency of rail joints and in the cost of their maintenance is the manner of their application to the rails and the proper laying of the rails. The expansion and contraction of steel rails due to changes of temperature are very positive phenomena of nature and cannot be prevented or abolished. Consequently when laying rails the temperature of the rail itself should be determined at frequent intervals and the proper amount of space to take care of all expansion which may occur should be provided by use of spacing shims. The rails should be anchored at once to preserve the expansion space provided for each rail, instead of permitting it to bunch up, resulting in tight joints at some places and wide spaces at others.

The joint bars should be clean and should be given a coat of oil all over and preferably a coating of graphite on the bearing faces. The oiling of the underside of the head and the upper side of the base of the rail for the length of the joint bars is also good practice. The joints should then be applied and bolted up as tightly as they can be without making them so tight as to prevent the slip of the rails due to expansion and contraction. In order to insure the rails lining up correctly, that is, to avoid lipped joints, the two bolts nearest to the rail ends should be tightened a little ahead of the remaining bolts.

The Maintenance of Joints

The maintenance of the joint bars should consist in seeing that all cracked or broken joints are replaced promptly, keeping the joints bolted tightly enough to transmit the stresses properly from each rail to the other and making sure that the joints are not bolted too tightly to permit of the slip of the rail to take care of the expansion or contraction of the rails due to changes in temperature.

Track men should not get the idea that every bolt must necessarily be tightened some when going over their track tightening bolts. Some bolts may be tight enough.

Care should be taken to avoid the use of wrenches which are too long, as the use of extra long wrenches is sure to result in some joints being bolted too tightly, where high strength bolts are used.

The condition of the rail ends is very important, and foremen should be instructed to have any metal which rolls out from the end of the rail sawed or chipped off to prevent its acting as a wedge when the rails run together, and causing a chip to be split off the end of the adjoining rail. When rail ends become battered or chipped to such an extent as to cause pounding of the joint, they should be repaired by welding. Section foremen should be instructed to keep watch of joints which are battered or chipped enough to cause extra work to be done to keep them surfaced up, and to notify the roadmaster at regular intervals of the number and location of joints needing the attention of the welding gang.

Committee: C. W. Baldridge, assistant engineer, A. T. & S. F., chairman; Arthur Craine, district engineer, C. B. & Q.; John Sheehan, roadmaster, L. V.; B. E. Haley, general roadmaster, A. C. L.; Philip Chicoine, roadmaster, C. P.; G. H. Warfel, roadmaster, U. P.; T. W. Brown, roadmaster, C. R. I. & P.; aid, C. E. Doty, supervisor, N. Y. C.

Discussion

A considerable difference of opinion developed regarding the statement that joint bars designed to fit the top and bottom of the base of the rail and with little or no bearing against the head of the rail, were likely to result in base failures. Considerable discussion was also evoked as to the influence of the design of the joint on chipped rail ends and the proper allowance for expansion, emphasis being laid on the fact that if sufficient provision is not made for expansion in rail laid in the winter, it will result in a tight rail in hot weather. The convention also discussed the relative merits of the six-hole joint and the four-hole joint, and expressed its preference for the latter by vote.

Placing the Track Department on a Business Basis

By C. A. Morse
Chief Engineer, Chicago, Rock Island & Pacific

I have often wondered how it happened that those who organized the track department on the railroads of the country 50 to 75 years ago could have had such wonderful foresight as to devise an organization that could not or would not be improved in all these years. If you will look over the organizations of the majority of our railroads today, you will find that the organization of the track department, up to and including the roadmaster, is practically the same today as it was when I was first employed on a railroad in 1880.

Some roads use the term "supervisor" for what on most roads is called a roadmaster. The definition of a supervisor is one who supervises an overseer, and the fact that this term has been applied to men occupying the position of roadmaster would seem to indicate that their duties were those of an overseer. I think that the fact that this name has been applied shows the idea that has been in the minds of too many high officials, and explains why the roadmaster's organization has not been changed or improved in the last 50 years. Instead of the roadmaster being considered a supervisor, he should be considered an instructor, a planner, and an organizer. The supervisory duties are a side issue and not his principal duties.

It was in accord with these supervisory ideas that the practice developed of roadmasters riding back and forth over their divisions on passenger trains and throwing off "butterflies." A roadmaster has no business on a passenger train more than once a week, just often enough to see how the track rides under high speed trains.

On the majority of the railroads of the country there

should be a complete reorganization of the roadmaster's forces. The roadmaster should have office help enough so that he can spend the working hours on the road, not riding on passenger trains, but out with his foremen, getting to and from the points where they are working on a motor car. He should not plan on being home every night but should have an expense account and he should stay out on the road over night whenever it will save time. He could do this if he had some one in his office who could take care of correspondence and could keep him informed by wire of any special messages or instructions.

More Definite Planning Is Needed

The greatest weakness in our track forces is the lack of definite planning of their work. They do all right when they are inserting ties, ballasting, repairing fences or some such work where they have a definite job to do on any particular day, but as we all know, the greater part of their time is occupied in doing odd jobs, and in keeping up the line and surface of the track. It is in connection with this class of work that some planning is necessary.

The roadmaster should go over each section with the foreman each fall and plan the work other than line and surface that should be done the coming year. A list should be made of this work. This should be sent in to the officer to whom the roadmaster reports and should form the basis for the maintenance budget for the coming year.

The roadmaster should go over with each foreman the portion of this work that can be done in January and the foremen given a list of this work. This list should be posted in the tool house and each night if any of this work has been done that day it should be noted. When any item is completed a pencil line should be drawn through it. The roadmaster should go over the coming month's work with each foreman prior to the beginning of the month. There will be spotting up to do from time to time, but when that is done, the gang should get at once on to some of the work that was planned for the month.

On long divisions or very heavy traffic divisions the roadmaster should have an assistant, as the roadmaster cannot get over the line often enough to carry out this program and at the same time see that the work planned has been done, and done properly. Quite a percentage of his foremen will acquire the habit of planning their work at the end of a year or two and eventually as the younger men step into these jobs, one of the requirements for a foreman will be that he can plan his work ahead.

Too Many Staff or Committee Meetings

One thing that is interfering more or less with a roadmaster's handling his work efficiently is the mania that has sprung up in the last few years for divisional meetings for all kinds of things. On some roads this is being worked overtime and roadmasters are taken away from their work as much as one day per week to attend these meetings. The idea behind these meetings is all right, but the object sought should be worked out so as not to interfere too much with a roadmaster's work.

One of the great handicaps to getting the track forces organized on an efficient working basis is the fact that for years the track department has been used as a "grab bag." If some official in the operating department wants to make a showing in some month, or if earnings drop off, they "grab" a lot of the maintenance of way allowance and it usually comes from the track. To carry out their orders it completely disorganizes the track work. If we could get the work of the track department so organized that we could get uniformity in our maintenance it would remove this temptation and would as a result reduce the cost of track maintenance to a minimum, and at the same time result in fairly uniform track condition.

The monthly allowance method of handling maintenance of way expenditures, especially as regards the track department is a very extravagant way of handling this class of work. If the annual expenditures for maintenance of way other than operating expenses in connection with improvement work were compared from year to year they would be found to vary but little as a whole, but compared by months they fluctuate very materially due to their being cut at different times for reasons before mentioned.

The result is that not less than 10 per cent and in many cases as high as 25 per cent of this allowance is absolutely wasted, due to loss in connection with the reorganization of the forces several times during the year and due to a large allowance when business is heavy and a small allowance when business is light. My thought is that all material for ordinary maintenance including rail and fastenings should be charged out arbitrarily in equal amounts during the different months of the year, regardless of the business being done, and that the labor should be given as a yearly allowance, restricted possibly to a total for each three months of the year, but under no condition should it be made for a single month, as this invariably interferes with the economical handling of the work, and either restricts the work that should be done or causes a disorganization of the forces.

The Handicap of a Uniform Wage Scale

Another handicap that track maintenance has been working under for years is that all men working on track work other than foremen or assistant foremen are classified as laborers and all the men in a gang are paid the same wages. The man with years of experience receives no greater pay than the foreign laborer who cannot understand what is said to him, or the green farm hand who knows nothing about the work. Such a practice is wrong, it stifles ambition by continually giving no reward for skill and experience. We today use seniority combined with skill as the rule for retaining men in service when forces are cut, but do not recognize skill and experience in wages while the men are employed.

My own idea is that track forces should be divided into trackmen, trackmen's helpers and common laborers, and that where there is but one man on a section he should be a "trackman." When two men are employed the second should be rated as a "trackman's helper" and when three men are employed that the third should rate as a "common laborer." In large gangs they should be similarly divided and in the case of an extra gang it should be made up of approximately one-third of each class of men. Such a classification will permit paying more to the skilled man and it will awaken the ambition of each of the other classes to advancement. There is nothing that awakens ambition as much as the opportunity to earn more money.

The result of such a classification would be increased interest in the work by all three classes and the foreman would have the "trackmen" as men whom he could put in charge of any special job where he had to or wanted to divide his gang. The increase in wages to the skilled man would not affect the railroad materially.

No increases in trackmen's wages should be considered without some such classification.

Furnishing Section Houses a Discrimination

One of the things that has come down to many railroads from their pioneer days is the furnishing of quarters for section foremen at a nominal monthly rent. Such a rent was not so much out of line in the days when the salary of a section foreman was about $45 per month and when there were no towns where he could rent a place to live. Today with towns grown up along the railroad and with section foremen getting 2½ times their former salaries, there is no reason why they should not pay a rental for living quarters that will pay interest, depreciation, repairs and taxes on the improvements used by them.

This works as a discrimination between foremen, as the man located at a point where there is no section house gets the same salary as the man that lives in a company house, and if he can rent a house, he has to pay the higher rental, while if there are no houses to be rented, he has to live in an old box car. The result is that men will not bid for a section that has no house and you cannot get as good foremen on these sections as you can on the other sections.

Equal treatment to all is what we should plan to give, and there is no reason why the railroad should contribute house rent practically free to one man and make another rent a house or buy one in order to have a place for his family to live. It is not only unfair but it is decidedly unbusinesslike.

What we should endeavor to do is to get the handling of the track department brought to business-like methods. I have given these ideas of mine to your association with the thought that possibly they might be well enough received that you would turn them over to some of your committee.

Why Care in the Selection of Cross-Ties?

By John Foley
Forester, Pennsylvania Railroad

Standard specifications for cross-ties have been developed by co-operative effort of representatives of the consumers, the producers, and the public. They have been approved and adopted by organizations of consumers and producers. They have been issued by consumers and orders under them have been accepted by producers. All this being the case, what more is to be done? Nothing, except to see that the ties received are standard ties. Who is in the best position to know whether or not standard ties are delivered? The man who uses them. As the men responsible for the selection of the materials that will give the best results, viz: the minimum expense to meet a given standard of service, have you members of the Roadmasters and Maintenance of Way Association assumed your full responsibility by seeing that suitable cross-ties have been supplied? Or have you been willing to take the ties given you, and make the best of them, whether they have been good, bad, or indifferent? This latter attitude on the part of the track man lets many unfit ties get into track, where they are not worth their cost.

On most railroads the executive officers of the maintenance of way department have determined the kinds and sizes of ties required for the various densities of traffic of their lines, like they have fixed the weights of rail required in your different lines. Without some such standards for cross-tie use, economical maintenance of track is impossible.

Who Should Insist on Good Ties?

The knowledge required to determine the proper tie for each class of track is wasted if the ties received for installation are not of the character required, and if corrective measures are not taken. That many distributed ties are not suitable for the use intended is well known. That most of them would be as required if more insistence were placed on getting them right is conceded by all familiar with the problems of tie procurement. Who should insist on good ties? The track man first, last, and all the time. It is money from his allotment which pays for the ties, and it is therefor his business to contend for his money's worth.

The premature renewal of a cross-tie is an unwarranted charge against the maintenance-of-way account. Negligence on the part of someone is responsible if the tie failed because it was not large enough, solid enough, or sound enough to render full service where it was used. Some of this responsibility rests on the roadmaster or track supervisor, if he has used without comment Size 3 ties only 5 in. thick or 6 in. wide. Had he protested, he might have caused an inspector to be more careful thereafter or stopped a buyer from taking credit for purchasing ties at low cost, when actually he is getting only what he pays for.

Use of Standard Specifications First Step

Few railroads accept unfit ties deliberately and regularly. Some do so under the delusion that they need to, in order to save money or to secure their supply. The fact that accepting sub-standard ties raises prices and depresses production is a phase of the education of those responsible for the procurement of ties which is not within the province of this paper. Other railroads are woefully careless in connection with the inspection of cross-ties, and it is cure for this carelessness with which we are concerned. The first step is the adoption by all railroads of the standard specifications for cross-ties. This has been urged on each railroad by the president of the American Railroad Association in circular No. IV-45, July, 1926. If your railroad has not yet issued specifications in accordance with the standard, you are solicited to stress the importance of doing so. The standard is adaptable to conditions anywhere. You will find that it covers any kind of wood you wish to use and any size of tie you have need for. You need include in your own standard only the kinds and sizes you desire. Do not rest satisfied with the assertion of somebody that circumstances surrounding the conditions of supply, purchase, distribution, consumption, or use are peculiar in your particular case and justify departure from this standard. This cannot be because the standard is so comprehensive as to cover any conceivable condition.

All those interested in track maintenance should familiarize themselves with the A. R. A. standards for cross-ties. They should ask for ties in accordance with these standards and promptly report the receipt of non-standard ties. If those who install cross-ties

would drop the attitude that "a tie is a tie," and that they must use whatever ties are given because for some unexplained reason proper ties are not supplied, most of the present unsatisfactory situation would be eliminated. Many of the poor ties going into track get there because the roadmasters do not know what character of tie they are supposed to be supplied with, and because the trackmen do not know the specifications under which their ties are bought, and are therefore not in a position to determine whether the ties delivered are what they should receive.

Should Be Grade Marked

Where track men inspect for acceptance the ties which are purchased, they have no one to blame but themselves if they procure poor ties. Where the ties provided for their use are accepted by a regular inspection force, track men will be helped very much in contributing to the control of expenditures for ties if each tie received has on it marking of some kind to designate the standard size for which it was accepted, for without a mark to designate the standard size it is supposed to be, each tie received would have to be re-inspected by track men and the resulting tally compared with the shipping notice.

Experience has shown that where the marking to designate a standard size of cross-tie is supplemented by a mark to identify the inspector responsible for the acceptance of the tie, much better work is done. The inspector who knows that each tie he accepts carries on it a number or other mark that shows his responsibility for it is not as apt to be as reckless in his decisions as the inspector who is aware that there is no way to check his acceptance of individual ties.

Please do not be content with the mere adoption of the standard specification by your railroad. Simply ordering standard cross-ties will not insure the receipt of them. The standard specification must be supplemented by a standard inspection which is a firm, but fair, enforcement of the requirements.

Good Ties Are Available

You may be told that nature provides trees grown in such a way that cross-ties meeting standard requirements cannot be had in quantity; but do not believe it. The study given to standard specifications covered all phases of the subject and you must rest assured that satisfactory ties can be procured wherever suitable trees and efficient manufacture are to be found.

You may be told that to conserve the forest you should use ties with small rotten spots in them; but do not believe that. The decayed area is very likely larger inside the tie than it shows on the surface and you are too intelligent to consider saving the loss of one rotten tie in the woods at the expense of one or more additional renewals in your track.

You may be told that forest conservation calls on you to use small ties in order to avoid wasting the tops of trees; but do not believe it. Railroads have no responsibility for the complete utilization of every tree from which a manufacturer elects to cut one or more ties.

You may be told that more ties should be treated; and you can agree that there is room for improvement. However, no wood-consuming industry has done more to lessen the drain on the dwindling forests of America than has the transportation industry. The railroads are not only the pioneers in the field of wood preservation, but maintain leadership in this primary phase of intelligent wood utilization and conservation by using over 90 per cent of all the wood given preservative treatment, of which cross-ties constitute about 70 per cent.

You may be told that railroads today require on the average better and bigger ties than in the past; and, you can easily justify this improvement by showing how the service demanded of the ties has steadily increased as the wheel loads of both cars and locomotives have mounted. As a matter of fact, the sizes of ties are no larger than they were 25 years ago. The difference between then and now is that more of the big sizes are used as the traffic requiring them has become more widespread.

Discussion

H. R. Clarke (Burlington) endorsed the stand taken by Mr. Foley and emphasized the importance of greater care in the acceptance of ties, because of the magnitude of expenditures involved in annual tie purchases. Mr. Clarke said that roadmasters should have no difficulty in carrying out Mr. Foley's suggestion. In answer to questions Mr. Foley stated that tie producers could supply ties in quantity, of whatever grades it was desired to obtain.

The Repair of Track Tools

Report of Committee

The Committee on the Repair of Track Tools reported:

1. We recommend that each railroad repair its own tools in preference to turning them over to any outside concern. If tools are returned to the manufacturer, it interferes with buying from other concerns and limits competition. It also requires railroads to invest in a larger stock of tools.

2. The bulk of the tools should be repaired in one central shop. Minor repairs can be made currently at the nearest point with the forces employed at roundhouses, car shops, etc.

3. The central shop should be under the supervision of the stores or the maintenance of way department, where special mechanics who are familiar with the requirements will make repairs. In the absence of competent mechanics to make repairs at roundhouses and car shops, all tools should be sent to the central shop.

4. There should be a store at the central repair point to handle all track tools for the system, at which requisitions can be filled for new tools needed and credit given to divisions which return tools for repairs.

5. We find that track chisels, claw bars and spike mauls are the most difficult tools to repair. The remedy for this lies with the manufacturers making tools of a better grade of steel and with the railroads purchasing the better grade without permitting price to be the dominating factor. If this is done, a mechanic will be able to do better work.

6. Tool dressing is an art and requires study and experience on the part of a mechanic, but the best mechanics cannot make first-class tools from poor steel. Therefore, they should be furnished with the best of materials and up-to-date equipment in order to do first-class and economical work.

7. Track drills are not difficult to repair by a man who understands the work; yet we have numerous complaints from this source. The defect is mostly with the feed, lost motion in gears and sharpening the bits. New parts should be furnished for the gears and feed when worn out and bits should be ground to a perfect center and full cutting face.

8. Section and extra gang tools that need repair should be returned to the repair point at least once a month so that they can be repaired and returned to service. When extra gangs are taken off, all of their tools should be sent to the central shop and not stored on the divisions. The extra gang tools can be repaired during the slack season and be ready for service when needed.

9. The section foreman in charge of tools should be the judge when tools need repair and he should be responsible. He should inspect tools frequently, and see that all surplus tools or those that need repair are shipped in. Where supply trains are operated each month to distribute new tools and materials, the roadmaster should accompany the train and collect an old tool for each new one given out. He also should keep posted on the number of tools his men keep on hand.

10. It is difficult to set a standard of wear on tools before they should be classed as beyond repair, but, after careful study, the committee recommends that tools should not be repaired when worn beyond the following limits:

Adzes that will not grind 7 in. under the center of the eye.

Track chisels that will not dress 5 in. under the center of the eye.

Dirt picks that will not dress 11 in. under the center of the eye.

Spike mauls that will not dress 5½ in. under the center of the eye.

Claw bars that will not dress 8 in. from tip of claw to end of heel and be 3¼ in. thick from top face to bottom of heel and 2½ in. thick half-way between heel and end of claw, while the top face shall be 2 in. wide with a gradual rounding slope from heel to tip of claw.

Track shovels when the blades are worn to less than 10 in. in length. For quantity shoveling no shovel should be used that is not nearly full size and one that is worn off should be condemned for this purpose as the cost of the shovel is wasted quickly through inadequate size for quantity shoveling.

11. We recommend that a strap of iron ½ in. in width and ¼ in. thick be welded around the head of a track chisel and placed so that the top of the strap will be 3/16 in. below the top of the chisel. This will help greatly to prevent the head of the chisel from splitting and chips flying. A soft sledge should be used to strike chisels, rather than a spike maul; the life of the chisel can be prolonged if this is done, the sledge to be not more than 10 lb. in weight. A spike maul will last three times its present life if used for driving spikes and not for striking chisels.

12. We recommend that it be the aim of all railroads to equip extra gangs, both steel and surfacing gangs, with the best tools available as their's are production jobs. Tools no longer fit for their use may be very efficient tools for section gangs after being repaired, as they do not use any one tool, such as spike mauls, claw bars and adzes, all of the time.

13. At the central repair point, the storekeeper should have charge of all new and repaired tools, as the accumulation of track tools not in service will be at this point and be a guide as to the quantity that it is necessary to purchase.

14. It is our opinion that money is saved by buying good tools. We have known men to buy tools in preference to using the tools furnished them.

Committee: B. C. Dougherty, roadmaster, C. M. & St. P., chairman; M. J. Dillon, roadmaster, M. P.; J. A. Roland, roadmaster, C. & N. W.; R. J. Yost, roadmaster, A. T. & S. F., and J. B. Martin, general inspector track, N. Y. C.

Discussion

The discussion developed a considerable difference of opinion as to the relative advantages of repairing tools by company forces or by contract. While some speakers reported experience which indicated improper workmanship by company tool men, the consensus of opinion was favorable to the committee's recommendation for the repair of tools in company shops. Methods of issuing tools to track gangs were also discussed at length and several speakers made a plea for a greater simplification of the procedure for obtaining additional tools other than those required to replace defective tools. The committee's report was accepted without any change.

The Rearrangement of Track Work to Promote More Uniform Employment

Report of Committee

With the co-operation of a railroad management a uniform maintenance of way force the year round can be made a success on any railroad regardless of climate or location. The following items of work can be carried on throughout the winter: (1) Spotting and distributing of ties; (2) laying new rail and picking up old rail and scrap; (3) gaging track and applying tie plates; (4) tightening bolts; (5) tapping down spikes; (6) widening banks with cinders; (7) ditching, and (8) building fence. When the weather is extremely cold and a heavy snow storm is keeping a gang from doing anything else, there is sufficient work for a uniform force in keeping the switches, yards and interlocking plants open.

The ties should be spotted in the fall and a record made of the number needed between each two mile posts. As soon as the new ties are received they can be distributed with a work train and be ready for renewals in the spring. The track can be gaged in the winter and the application of tie plates can all be done. All bolts can be tightened and spikes tapped down during the winter, while banks can be widened with surplus cinders.

New rail should and can be laid in the winter, regardless of the presence of snow on the ground, as snow on the track is never deeper than the rail. Two men with brooms can go ahead and sweep the snow away from the rails. The chairman of this committee re-laid the rail on 26 miles of track with new 100-lb. rail last winter and could have laid four times as much if he had been furnished the rail. On this work the section forces were doubled up and a work train and a rail loader used. The rail was unloaded from cars, after which the men went back over the same territory and picked up the old rail and scrap. This force laid an average

of 13,000 ft. of new rail in eight hours with 80 men. By doubling up section gangs in this manner there is no need to hire new men for the work. On the chairman's subdivision 15 miles of fence was repaired and built and ½ mile of ditches was cleaned during the winter. There are many days during the winter when the ground is not frozen hard enough to prevent ditching.

By maintaining uniform forces the year round, all of the work mentioned above can be done in the winter. As a result there is no need of hiring inexperienced men in the spring, for the regular forces can take care of the tie renewals, surfacing of the new rail, lining of track, the application of new ballast, the correction of the sod and stone lines, and the weeding and mowing of the right-of-way.

Committee: J. Clark, supervisor, B. & O., chairman; C. W. Coil, roadmaster, N. P.; Oscar Suprenant, roadmaster, D. & H.; W. A. Clark, supervisor, P. & R.; W. E. Carter, supervisor, B. & L. E.; R. H. Smith, assistant superintendent, N. & W., and W. F. Nichols, supervisor, L. V.

Immediately after the presentation of this report, Lem Adams, roadway assistant on the staff of the president of the Union Pacific, presented a paper on the same subject, in which he pointed out the importance of the maintenance of a fairly uniform force throughout the year as a means of retaining efficient men in service. The most important work that can be done during the winter is rail renewal, for which section gangs can be bunched, avoiding the necessity of recruiting extra gangs later. Other work which he stated could be done during cold weather includes adzing and gaging rail, tightening bolts, driving down spikes, repairing frogs and switches, applying rail anchors, installing tie-plates and repairing right-of-way fences. With this work out of the way the forces are ready to start tie renewals as soon as the frost is out of the ground. "You," he said, "the official custodians of the track, are more vitally concerned than anyone else. You can preach to your officers the doctrine of economies to be realized through uniform forces."

Discussion

The discussion of this report and paper developed a considerable difference of opinion among those present as to the extent to which greater uniformity of forces could be effected by increasing the amount of winter work. However, it was the common opinion that the working season could be largely expanded and that many expedients could be adopted which would decrease the spread between summer and winter forces. Several speakers objected to the opening sentence of the committee's report on the ground that it expressed too optimistic a view of the possibilities, and upon a motion it was amended so as to read that "Uniform forces can be made a success where climate and other conditions permit."

The Collection and the Use of Cost Data by Supervisory Officers

Report of Committee

The collection and use of cost data by supervisory officers is a problem which confronts all supervisors or roadmasters in the execution of their various duties in maintenance of way work. Efficiency in the operation and maintenance of railroads is promoted and encouraged largely by the comparison of one road with another and of various divisions and departments of the same system with each other.

It is a difficult problem to devise a method of cost keeping which will serve the purpose of supervisory forces and at the same time be simple and intelligible to the foremen, on whom rests the responsibility for reporting charges accurately to the various accounts or headings. In order to procure accurate costs it is necessary that a form of report be adopted which can be easily understood and filled out by the section or extra gang foremen.

Few foremen are trained accountants and it is inadvisable to add to their many burdens by demanding complicated reports from them.

In making reports the labor should be divided between productive and non-productive time. This should be taken into consideration for in many cases on single track territory much time is lost when it becomes necessary to close the track for trains. With productive time as a basis, comparisons can be made which will show just what items are costing more on one district than on another and from these comparisons steps can be taken to investigate and eliminate any practices which may be the cause of the higher costs.

The number of lineal feet of rail laid in a day and the number of tie plates and anti-creepers, frogs and switches installed should be recorded on daily reports so that the unit costs can be ascertained easily.

Every man in charge of the details of maintenance of way operation is compared with some other man in the same class of work by his higher officers. It is the man who produces the best results with the same number of man hours or amount of money who is worth more to his employer. It is by a comparison of costs as well as by the work that the best results are obtained.

Committee: E. P. Hawkins, division engineer, M. P., chairman; G. W. Koontz, division engineer, St. L. S. F. & T.; A. A. Cross, supervisor, N. Y. N. H. & H.; S. A. Bryan, roadmaster, S. A. L.; F. R. Rex, supervisor, Penna.; M. Donahoe, general roadmaster, C. & A.; J. Morgan, supervisor, C. of Ga.

Election of Officers

At the closing session on Thursday morning the following officers were elected for the ensuing year: President, J. B. Kelly, general roadmaster, Minneapolis, St. Paul & Sault Ste. Marie, Minneapolis, Minn.; first vice-president, J. P. Davis, engineer maintenance of way, Central Indiana Railway, Anderson, Ind.; second vice-president, H. R. Clarke, general manager of permanent way, Chicago, Burlington & Quincy—Colorado & Southern, Chicago; secretary, T. F. Donahue, general supervisor of track, Baltimore & Ohio, Pittsburgh, Pa.; treasurer, James Sweeney, supervisor, Chicago & Eastern Illinois, Danville, Ill. Members of executive committee, F. J. Meyer, assistant engineer, New York, Ontario & Western, Middletown, N. Y., C. W. Baldridge, assistant engineer, Atchison, Topeka & Santa Fe, Chicago, and A. E. Preble, supervisor, Pennsylvania Railroad, Middletown, Pa.

On Thursday afternoon, after the close of the convention, a special train furnished by the Illinois Central carried the roadmasters on an inspection trip over the

Chicago terminals of that road, affording an opportunity to see the extensive improvements and electrification carried out during the past few years. One feature of the trip was a visit to the new Markham yard for an inspection of the two types of car retarders in operation there.

Manufacturers Present Interesting Exhibits

An exhibit by 52 manufacturers of track materials, appliances and tools was presented under the auspices of the Track Supply Association. While the space available did not permit all the exhibits to be shown in one room, the exhibit was conveniently located with respect to the convention hall and the lobby of the hotel so that all those attending the convention were afforded ample opportunities to visit it.

The officers of the Track Supply Association to whom the success of the exhibit is largely due are as follows: President, L. C. Ryan, Oxweld Railroad Service Company, Chicago; vice-president, A. H. Told, Positive Rail-Anchor Company, Marion, Ind.; secretary-treasurer, W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y.; directors, J. H. Horn, National Lock Washer Company, Newark, N. J.; Frank McAllister, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; W. W. Glosser, Verona Tool Works, Pittsburgh, Pa., and L. P. Shanahan, American Steel and Wire Co., Chicago; advisory directors, R. A. Van Houten, Sellers Manufacturing Company, and E. T. Howson, *Railway Engineering and Maintenance;* ex officio director, J. J. Cozzens, Union Switch & Signal Company; honorary director, G. W. Morrow, president, Roadmasters' and Maintenance of Way Association.

List of Exhibitors

American Chain Company, Bridgeport, Conn; guard rail clamps, replacers, rail benders, one-piece guard rail, compromise joints; J. J. O'Connel and W. P. Burleigh.

American Fork & Hoe Company, Cleveland, Ohio; rail anchors and tapered rail joint shims; A. F. Fifield, Emmett Keough, R. P. Wilkins, J. T. Reagan, S. L. Henderson, F. C. Stoell, H. C. Christy and L. D. Gibson.

American Hoist and Derrick Company, St. Paul, Minn.; illustrations and photographs of ditchers and caterpillar shovels; W. O. Washburn, W. B. Maurer and Miss Helen Hoeller.

American Steel & Wire Company, Chicago; fencing and posts, signal wire and bonds; L. P. Shanahan, H. A. Squibbs, H. S. Lockwood, D. R. Waterman, J. W. Collins and A. W. Froude.

American Valve & Meter Company, Cincinnati, Ohio; interlocking and gearless switch stand and safety locking device; J. T. McGarry, and D. J. Higgins.

Balkwill Manganese Crossing Company, Cleveland, Ohio; miniature of an articulated cast manganese steel crossing; S. Balkwill, T. P. Cagwin and E. D. Rogers.

Bethlehem Steel Company, Bethlehem, Pa.; rail anchors, switch stands, hook flange guard rail and gage rods. N. E. Salsich, J. F. Hennessey, F. M. Hoffman, G. H. Riddle, R. A. Malone, R. F. Deghuee, M. A. Vickers, G. A. Richardson, J. C. Tobias and G. L. Moore.

Buda Company, Harvey, Ill.; section motor car, motor car wheels, track drill and track liner; R. B. Fisher, J. L. Artmaier, G. A. Secor, A. J. Walch, R. M. Blackburn and W. Stratton.

Chicago Malleable Castings Company, Chicago; rail anchor, tie plates, and tumping post literature; Warren Osborn, J. S. Llewellyn, J. H. Slawson, W. L. Beaudway and C. A. Benz.

Cleveland Railway Supply Company, Cleveland, Ohio; flangeway guard, solid trough and open trough, foot guard, guard rails, switch stands and photographs of locomotive cranes; W. H. Neeson, H. P. Blum, F. A. Peck, O. J. Winsor and F. W. Cherry.

Creepcheck Company, Inc., Hoboken, N. J.; creepchecks T. D. Crowley, P. E. Browne, Frank Reagan, R. R. Dinklage and N. J. Leavitt.

Crerar, Adams & Co., Chicago; hand and power bonding drills, track drill, track tools, jacks, track liners and handles; Russell Wallace, J. A. Martin, G. D. Bassett, E. C. Peohler and Charles Grentz.

Duff Manufacturing Company, Chicago; track jacks and tie spacer; C. N. Thulin.

Edison, Thomas A., Inc., Bloomfield, N. J.; electric lighted switch lamp, battery cells and parts; R. J. Frost, P. A. Garrity.

Electric Tamper & Equipment Company, Chicago; gas-electric power unit; Corwill Jackson, H. W. Cutshall, R. O. Shaffer and V. G. Cartier.

Fairbanks, Morse & Co., Chicago; section car; F. M. Condit, E. M. Fisher, B. S. Spaulding, F. J. Lee, D. K. Lee, E. C. Golladay, J. L. Jones, G. Howard, C. B. O'Neil, H. L. Hilleary, and G. W. Lewis.

Fairmont Railway Motors, Inc., Fairmont, Minn.; section car, light inspection car, motor car engine and motor car two-speed transmission; W. F. Kasper, W. D. Brooks, E. R. Mason, K. K. Cavins, L. R. Payton and C. H. Johnson.

Hackmann Railway Supply Company, Chicago; track liner; Frederick Hackmann, Joseph J. Franzen, Arthur Schmidt.

Hayes Track Appliance Company, Richmond, Ind.; derail and operating stand, light portable derail and bumping post; H. J. Mayer, S. W. Hayes, Edgar W. Brown and E. L. Ruby.

Hubbard & Co., Pittsburgh, Pa.; shovels, track tools and nut locks; W. H. Remmel, M. Lasher, H. M. Pforsich and J. S. Wincrantz.

Ingersoll-Rand Company, New York; pneumatic tie tamper, rail drill, nutting machine, bonding drill, concrete breaker, hammer and chipper; William H. Armstrong, George W. Morrow, L. A. Luther, T. H. Weigand, E. F. Kultchar and Fred Orsem.

Jordan Company, O. F., East Chicago, Ind.; model moving pictures of spreader; A. L. Greenabaum, J. C. Forbes, C. H. Staples, A. W. Banton, A. Jones and J. F. Curtis.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.; motor cars and combination track gage and level; Frank E. McAllister, R. E. Keller and C. E. Bridge.

Kentucky Rock Asphalt Company, Louisville, Ky.; photographs and literature on Kentucky Rock Asphalt; W. F. Pollard, W. A. Brownfield and T. J. Foy.

Lundie Engineering Corporation, New York; tie plates, rail anchors; L. B. Armstrong, Eugene Brandeis and George Nibbe.

Magor Car Corporation, New York; photographs of dump cars; J. J. McGarrigle.

Maintenance Equipment Company, Chicago; friction car stop, track tools, moving pictures of rail layer, power ballast screen, skeletonizing machine, power track ballaster and combination tie plate; H. C. Holloway, J. A. Roche, Emmons Overmier, A. L. Arnold and E. J. Van Patten.

McMyler-Interstate Company, Cleveland, Ohio; switch stands and photographs of locomotive cranes; H. C. Odenkirk.

Mechanical Manufacturing Company, Chicago; bumping post; H. E. Johnson.

Mudge & Co., Chicago; motor cars; R. D. Sinclair, Albert C. Force, A. R. Fletcher, V. Pagett, F. C. Whitehouse, L. B. Ryan, C. P. Benning, W. L. Currier, W. D. Achuff and F. H. DeBrun.

National Lock Washer Company, Newark, N. J.; spring washers; J. Howard Horn, W. R. Hillary and R. L. Cairncross.

Northwestern Motor Company, Eau Claire, Wis.; transmission for heavy duty motor car, four-horsepower engine for light inspection car, photographs and literature on motor cars, discers, gas-electric power plant and trailer; F. W. Anderson, A. H. Nelson, R. R. Rosholt, F. C. Datesman and Otis B. Duncan.

Oxweld Railroad Service Company, Chicago; welding apparatus; L. C. Ryan, F. C. Hasse, C. A. Bloom, W. E. Campbell, F. J. Duffie, J. J. Graham, A. S. Jones, F. H. Lurquin, F. J. Lynch, J. E. Winslow, W. A. Hogan, A. N. Lucas, H. W. Schultz, W. A. Champieux, William Leighton and W. H. Kofmehl.

Pocket list of Railroad Officials, New York; copies of publication; J. Alexander Brown and B. J. Wilson.

P. & M. Company, Chicago; anti-creepers, and bond wire protectors; D. T. Hallberg, F. A. Preston, George E. Johnson, W. H. Reaves, M. K. Ruppert, P. H. Hamilton, S. M. Clancey, J. J. Gallagher and William Cunningham.

Positive Rail Anchor Company, Marion, Ind.; girder type guard rail, rail anchors and guard rail plates; A. H. Told and L. C. Ferguson.

Q. & C. Company, New York; one-piece manganese guard rail, guard rail clamp, compromise joint, switch point guard, insulated joint, steel fence posts and derails; R. J. McComb, J. L. Terry and L. Thomas.

Racine Tool & Machine Company, Racine, Wis.; rail cutting machine; J. M. Jones and Ray Fuller.

Rail Joint Company, New York; insulated joints, compromise joints, standard joints, head free joints, reinforce joints, track liner and motion pictures; Alex Chapman, V. C. Armstrong, A. E. Condit, Jr., D. L. Braine, H. C. Hickey, C. B. Griffin, C. H. Larson, Thomas Ryan, J. N. Meade, M. Markley, W. A. Gadd, B. G. Braine and Charles Jenkinson.

Railroad Accessories Corporation, New York; power track drill and ballast bucket; B. A. Lundy.

Railroad Supply Company, Chicago; tie plates; W. S. Boyse, R. E. Bell, G. T. Williams, M. J. Fox, John Hensel, T. H. Cole and A. H. Smith.

Railway Age, Chicago; L. B. Sherman.

Railway Review, Chicago; copies of publication; B. V. Crandall, J. E. Gougeon, J. A. Walsh, George E. Boyd and A. D. McIntyre.

Ramapo-Ajax Corporation, Hillburn, N. Y.; automatic switch stand, positive switch stand, double shoulder switch plate, switch clip, adjustable switch brace, guard rail clamp, rail expander and forged braces; J. B. Strong, J. E. Davidson, T. E. Akers, D. E. Hilton, Dickson Fairback, W. J. Fairback, Paul Hoffman, W. Bender, J. V. Houston, C. A. Carlson, W. Janicki and G. M. Cooper.

Reade Manufacturing Company, Jersey City, N. J.; model of chemical weed killing work train; R. W. Pritchard.

Reliance Manufacturing Company, Massillon, Ohio; spring washers; H. J. McGinn, R. Shireman and E. C. Cross.

Sellers Manufacturing Company, Chicago; wrought iron tie plates and guard rail plates; R. A. Van Houten, J. M. Sellers, G. M. Hogan and R. J. Platt.

Skelton Shovel Company, Inc., Dunkirk, N. Y.; track shovels; E. W. McCarty, H. C. Branahl and C. A. Trigg.

Templeton, Kenly & Co., Ltd., Chicago; track jacks, bridge jacks and

emergency jacks and tie spacing shoes; James L. Crowley, George L. Mayer and W. B. Templeton.

Union Switch & Signal Company, Swissvale, Pa.; insulated rail joints; J. J. Cozzens.

Verona Tool Works, Pittsburgh, Pa.; track tools, nut locks, track jacks, rail joint springs and rail anchors; W. W. Glosser, W. C. Dawkins, A. C. Laessig, B. M. Cheney and C. G. Ericson.

Warren Tool & Forge Company, Warren, Ohio; adzes, clawbars, lining bars, picks, spike mauls, sledges, hammers, track chisels, wrenches and gages; H. C. Mull and J. R. Konold.

Woolery Machine Company, Minneapolis, Minn.; motor car engines and parts; H. E. Woolery, D. A. Woolery, C. E. Berg and J. T. Stephenson.

Zenith Shovel Company, Chicago; shovels; W. H. True and Hans W. Nilsen.

NON-EXHIBITING MEMBERS

Andrix Lock Washer Company, Adrian, Mich.
Cleveland Frog and Crossing Company, Cleveland, Ohio.
Morden Frog & Crossing Works, Chicago.
National Malleable & Steel Castings Company, Cleveland, Ohio.
Parsons Company, The, Newton, Iowa.
Pettibone, Mulliken Company, Chicago.
Railway Purchases and Stores, Chicago.
St. Louis Frog & Switch Company, St. Louis, Mo.
William Wharton, Jr., & Co., Easton, Pa.
Wyoming Shovel Works, Wyoming, Pa.

At the annual meeting on Wednesday afternoon the following officers were elected for the ensuing year: President, A. H. Told, Positive Rail Anchor Company, Marion, Inc.; vice-president, J. Howard Horn, National Lock Washer Company, Newark, N. J.; secretary-treasurer, W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y.; directors, F. E. McAllister, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; W. W. Glosser, Verona Tool Works, Pittsburgh, Pa.; L. P. Shanahan, American Steel & Wire Company, Chicago, and B. J. Wilson, Pocket List of Railway Officials, Chicago.

R. H. Aishton Addresses Car Inspectors

AT the twenty-fifth annual convention of the Chief Interchange Car Inspectors' and Car Foremen's Association, held at Chicago, on September 21, 22 and 23, the feature of the opening session was an address by R. H. Aishton, president of the American Railway Association, who spoke in part as follows:

"When we consider the fact that the railroads of this country are at the present time loading over 1,000,000 cars per week, and have been for some weeks past, the question of the interchange and maintaining of these cars in proper condition for prompt and efficient service looms large in the public eye. Just think of it—1,000,000 cars and overloaded with freight per week, with the resultant interchange and inspection of this stupendous amount of freight car equipment.

"What lesson do we learn from it? It points out to us first of all that there must be prompt interchange of equipment at all points, with the elimination of any unnecessary technicalities in the rejection of equipment being interchanged, thereby cutting out unnecessary crosshauling of cars at terminals and eliminating the consequent unnecessary switching expense involved in the operation. This is a most important subject indeed, and one in which co-operation between you gentlemen working in the various terminals, and at other points throughout the length and breadth of this country of ours, will help accomplish results well worth your while. It is a subject that should be given constant study and attention and by working co-operatively together you can help add beyond measure to increase the efficiency and economy of operation.

"There is another lesson we learn from the present volume of weekly freight car loadings. It points out to us that running repairs must be made quickly and efficiently, because if they are not, the failure to do so will result in a slowing up of the operation of the plant. On the other hand, if you gentlemen see to it that these inspections and repairs are promptly, thoroughly and efficiently made the result will be better equipment, equipment that will run through promptly to destination and be available at all times for a shipper to load.

"Let us visualize the case of a carload of merchandise, badly needed by some merchant. If you gentlemen don't do your work in the proper manner, if your inspection is not properly made and some minor defect is overlooked which could just as well have been quickly repaired, the car passes the interchange point, gets out on the main line and what was a minor defect gets worse and worse with the passing of the miles. Pretty soon you will have a car that has to be cut out completely, perhaps causes a wreck, and then what happens? The merchant fumes, frets and waits, cusses the railroads and all that kind of thing, and all because somebdy overlooked doing his work as it ought to be done. Fortunately there has not been a great deal of this kind of thing happening lately."

Mr. Aiston then called attention to the important relation of the car inspectors' and car foremen's work to safe operation and emphasized the need of speedy handling of repairs to facilitate more intensive car utilization. He closed with the following remarks:

"In summing up I might say that the proper carrying on of all of your work as it ought to be carried on has a tremendous effect in many ways. It means less loss of life and limb of trainmen, greater car mileage, less accidents, less destruction of property and equipment, less repeated shopping of equipment, greater available car supply at all times, less need for the purchase of new equipment, decreased cost of operation and maintenance, more prompt handling of business, resulting in greater satisfaction to shippers and better earnings for the railroads. What better goal could you work to than this?"

Traveling Engineers Elect Officers

AT the closing session of one of the most successful meetings ever held by the Traveling Engineers' Association, the following officers were elected for the year 1927: President, J. B. Hurley, general road foreman of engines and fuel supervisor, Wabash, Decatur, Ill.; first vice-president, J. D. Heyburn, master mechanic, St. Louis-San Francisco, Ft. Smith, Ark.; second vice-president, James Fahey, traveling engineer, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; third vice-president, Ralph Hammond, traveling engineer, New York, New Haven & Hartford, Providence, R. I.; fourth vice-president, A. N. Boyd, road foreman of engines, Canadian National, Turcot, Que.; and fifth vice-president, H. B. Kelly, general road foreman of engines, Pittsburgh & Lake Erie, McKees Rocks, Pa. Davis Meadows, assistant division master mechanic, Michigan Central, St. Thomas, Ont., remains as treasurer, and W. O. Thompson, general superintendent rolling stock, New York Central, Buffalo, N. Y., secretary. Two new members were elected to the executive committee as follows: D. L. Forsythe, general road foreman of equipment, St. Louis-San Francisco, Springfield, Mo., and J. Keller, superintendent fuel department, Lehigh Valley, Bethlehem, Pa.

Great Northern Continues Slow Improvement

Earned $8.56 *a share in* 1925 *but has received no net return for* $97,800,000 *capital expenditures of past* 10 *years*

THE Great Northern which completed 1925 with net earnings of $8.56 per share on its stock promises to do slightly better than this in 1926 This was President Ralph Budd's conclusion following the publication of the June earnings statement and is borne out by the statement for July and the first seven months. The seven months' statement shows for this year an increase of $594,610 in gross income over the same period of last year and an increase of $586,103 (equivalent to practically all of the increase in gross) in net railway operating income. The net railway operating income for the first seven months of 1926 was $10,025,703; it compared with $9,439,599 in the first seven months of 1925, representing an increase of 6.2 per cent. In 1925 the Great Northern had a net operating income for the whole year of $28,276,183.

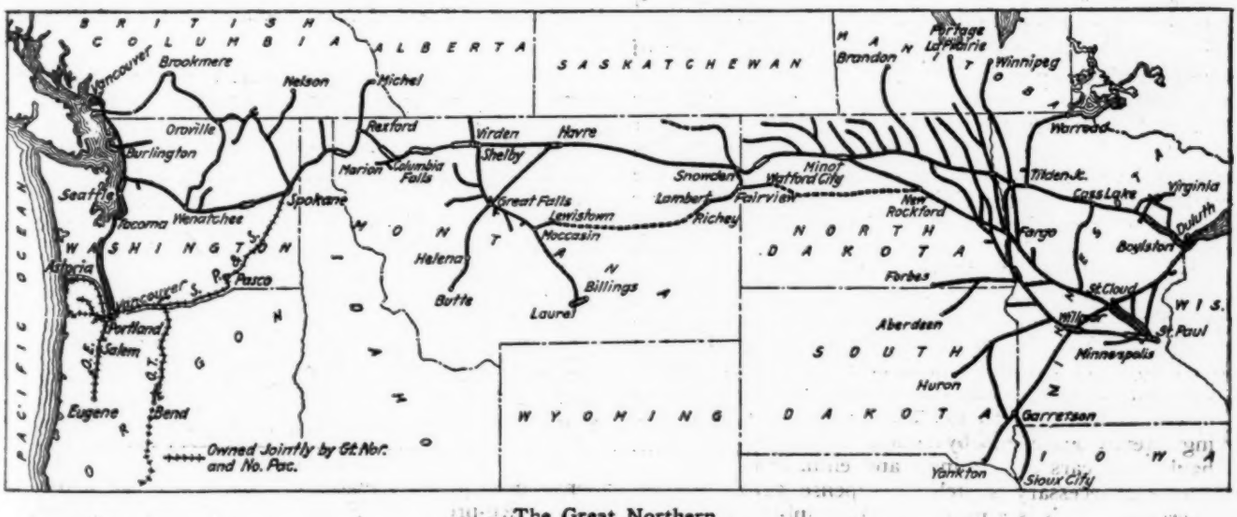
It is noteworthy that up to the end of the first seven months of 1925 the company had received about one-half of the year's total operating revenues but only one-third of the year's net railway operating income. This might indicate that the road perhaps was able to operate with greater efficiency in the latter five months of the year than in the first seven months. It is of interest in that connection that the operating ratio of the first seven months of 1926 was 73.9 which compared with 74.3 for the first seven months of 1925 and with 66 for the full year 1925. The ratio of transportation expenses to total operating revenues for the first seven months of this year was 34.4 comparing with 36.1 in the same period of last year and with 33.5 for the full year. In July, 1926, the operating ratio was only 62.7 and the transportation ratio only 29.0. If the same relationships apply this year as last, we can estimate the net operating income for the first seven months of 1926 as one-third the total for the year. This will give net railway operating income for 1926 in excess of $30,000,000 thereby making the year the best, from this standpoint, in the road's history.

The Great Northern has in recent years presented an unusual picture of a severe struggle against adverse conditions from which the road seems to be emerging with considerable success. In keeping with the rest of the roads in the northwestern region it has had to contend against the failure of rates to increase in proportion to the increased cost of doing business. As a matter of fact, the Great Northern has had a smaller percentage of increase in its revenue per ton per mile than the average for the northwestern region as a whole. In the case of some roads in this country it has been possible to make up for lack of sufficient increase in rates by a marked expansion of traffic and accompanying increased traffic density, bringing in the factor known by the economists as the law of increasing return. This has been particularly true in the southern district but it decidedly has not been true in the case of the Great Northern. For

TABLE I—GREAT NORTHERN TRENDS COMPARED WITH THOSE OF OTHER ROADS IN NORTHWESTERN REGION, WESTERN DISTRICT AND UNITED STATES

Net railway operating income for 1925 shown in percentage of standard return. Revenue ton-miles and revenue per ton-mile shown in percentages of figures for year ended June 30, 1916

	Great Northern	Northwestern Region	Western District	United States
Standard return....	$28,666,681	$148,734,272	$404,692,751	$906,894,745
1925—net railway operating income.	28,276,183	121,752,294	414,405,439	1,136,984,243
% of standard return	99	82	102	125
1916 — Rev. ton-miles, thous.....	7,809,817	45,017,216	112,846,134	340,689,980
1925 — Rev. ton-miles, thous.....	8,517,914	48,579,133	142,460,430	414,139,835
% of 1916.....	109	108	126	122
1916—Rev. per ton per mile, cents...	0.771	0.778	0.843	0.707
1925—Rev. per ton per mile, cents...	1.058	1.127	1.196	1.098
% of 1916.....	137	145	142	155



The Great Northern

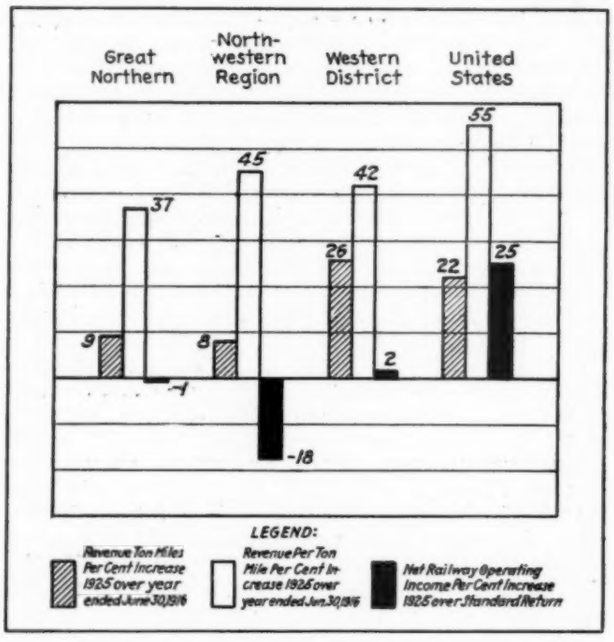
instance, its revenue ton-miles in 1925 were only 9 per cent greater than in 1916. Very likely the records would show that James J. Hill used to have to meet at times increases in business averaging this much annually.

Large Capital Expenditures

What then has enabled the Great Northern to hold its own so that it is still able to earn $8.00 to $9.00 per share on its stock? Judging from the statistics, one factor has been skilful and progressive management. It is also true, and this unquestionably is one of the most important features that stands out in Great Northern affairs, that the road has spent large sums for capital improvement—such notably as equipment, signals, etc.—which have assisted in effecting economies of operation. On the other hand, it happens that the Great Northern in 1925 had net operating income equivalent only to its standard return or annual average net railway operating income for the three years ended June 30, 1917. President Ralph Budd estimated in his tabloid annual report sent to the stockholders last January that during the ten years from the middle of the test to the end of 1925 property was added costing $97,800,000, the interest upon which additional investment would total more than $5,000,000 a year, but not a dollar of which—inasmuch as 1925 net operating income was the same as the standard return—has been earned. The $97,800,000 is equivalent to about $39 a share of the Great Northern's present capitalization. It represents less an investment than a price that some established business corporations often find themselves compelled to pay to continue in business as going concerns. Presumably the management of the Great Northern is optimistic enough to believe that the present is merely a transition period and that at some time in the future conditions in the Northwest will have so improved as to have justified the large capital expenditures that have been made.

Comparisons With Test Period

The information given in Table I amplifies these brief details. This table and the accompanying chart are similar to a table and chart which appeared in a review of Great Northern operations in these columns about a year ago except that whereas then figures were given for 1923 and 1924, they are now given for 1925. The data are intended to give a ready comparison of Great Northern results with those of the northwestern region, the western district and the United States as a whole. In the first place, comparison is made of the 1925 net railway operating income with the standard return for operations during federal control which was the average annual net railway operating income for the three years ended June 30, 1917. The figures show that the Great Northern in 1925 just barely failed to earn an amount equivalent to its standard return. However, it did better than its neighbors in the northwestern region, for the region as a whole earned only 82 per cent of its standard return. The western district as a whole exceeded its standard return by a mere 2 per cent and all the roads of the United States by no less than 25 per cent. It might be added that in the case of the Great Northern the 1925 net railway operating income was equivalent to only 5.12 per cent on its property investment whereas the northwestern roads as a whole earned only 3.60 per cent. However, it is also a matter of record that in the five years, 1921 to 1925, the Great Northern's net operating income lacked $45,300,000 of equaling the 5¾ per cent fixed by the Interstate Commerce Commission as a fair return. It is true that the fair return is supposed by the law to be figured for all roads as a whole or by groups,



Comparison of Trend of Great Northern Traffic and Earnings

but it is also to be presumed that the Great Northern, were conditions normal, would average better than its group rather than otherwise.

Comparison as to the traffic is between 1925 and the middle year of the test period, namely the year ended June 30, 1926. There is shown an increase for the Great Northern of only 9 per cent, an average increase of less than one per cent a year over the 9½-year period. The northwestern region had an increase of only 8 per cent, the western district of 26 per cent and the United States as a whole of 22 per cent. With further reference to the Great Northern, it might be added that the year ended June 30, 1916, was the road's busiest year up to that time. The busiest year the road has ever had was 1918 in which year revenue ton-miles were 13 per cent greater than in 1916. The revenue ton-

TABLE II—GREAT NORTHERN OPERATING RESULTS, SELECTED ITEMS, 1916 TO 1925.

Year	Mileage	Revenue Ton Miles	Revenue Passenger Miles	Rev. per ton mile cents	Total Operating Revenues	Total Operating Expenses	Net Operating Revenues	Operating Ratio	Net Railway Operating Income	Net After Charges
1916	8,098	8,018,210,000	608,621,000	0.761	$83,181,729	$48,569,202	$34,612,528	58.39	.....	.....
1917	8,233	8,399,349,000	667,036,000	0.766	88,598,735	59,282,156	29,316,578	66.91	.....	$23,040,172
1918	8,260	8,844,787,000	601,023,000	0.870	100,698,520	84,429,245	16,269,275	83.84	$12,368,069	20,063,270
1919	8,220	7,973,569,000	704,979,000	0.970	106,562,145	86,786,273	19,775,871	81.44	12,827,280	22,139,586
1920	8,174	8,518,841,000	685,005,000	1.054	122,597,865	113,947,115	8,550,751	92.94	3,017,647	19,304,097
1921	8,163	5,740,921,000	478,267,000	1.301	101,317,204	80,496,912	20,820,291	79.45	12,866,411	28,469,926
1922	8,261	6,882,465,000	450,053,000	1.134	103,452,937	79,636,038	23,816,899	76.98	17,276,598	10,865,672
1923	8,254	8,754,273,000	460,208,000	1.070	120,077,771	86,750,523	33,327,248	71.21	24,731,992	18,067,947
1924	8,251	8,093,136,000	422,372,000	1.064	110,243,104	75,212,058	35,031,046	68.2	24,201,287	17,941,600
1925	8,242	8,517,914,000	441,499,000	1.058	114,924,960	75,827,288	39,097,672	66.	28,276,183	21,435,396

Standard return for operations during federal control. $28,666,681.

miles of 1925 were the largest with the exception of 1918, 1920 and 1923. We do not have available any revenue ton-miles figures for 1926. The net ton-miles totals, including both revenue and non-revenue freight, have been reported for the first six months and show a slight reduction from the first half of 1925. In view of the fact that the Great Northern carries such a large proportion of its year's business in the second half year this evidence does not appear conclusive except as possibly indicating no marked change in the traffic situation.

Increase of Only 37 Per Cent in Rate Level

The third factor is the rate level. Table I gives comparisons of the revenue per ton per mile in 1925 as compared again with the middle year of the test period, the year ended June 30, 1916. It shows that in 1925 the Great Northern revenue per ton per mile was 1.058 cents or 37 per cent in excess of the 1916 figure. The northwestern roads as a whole had an increase of 45 per cent. The western district had an increase of 42 per cent but it will be remembered from the foregoing paragraph that

Table III—Comparison of Selected Freight Operating Statistics

	6 Mos. 1926	6 Mos. 1920	Per cent of change Inc.	Dec.
Mileage operated	8,218	.....	....	....
Gross ton-miles (thousands)	8,480,679	8,680,147	....	2.3
Net ton-miles (thousands)	3,899,229	4,420,039	....	11.7
Freight train-miles (thousands)	4,284	5,875	....	27.0
Freight locomotive-miles (thousands)	4,694	6,397	....	26.6
Freight car-miles (thousands)	220,478	219,731	0.4	....
Freight train-hours	370,040	E 576,707	....	35.8
Tons of coal consumed by freight locos.	642,400	930,627	....	30.9
Car-miles per day	23.7	26.8	....	11.5
Net tons per loaded car	26.5	27.3	....	2.8
Per cent loaded to total car-miles	66.8	73.7	....	4.9
Net ton-miles per car day	419	539	....	24.0
Freight cars per train	52.5	38.4	36.7	....
Gross tons per train	1,980	1,477	34.0	....
Net tons per train	910	752	21.0	....
Train speed, miles per train-hour	11.6	10.2	13.7	....
Gross ton-miles per train-hour	22.918	15.051	52.3	....
Net ton-miles per train-hour	10.537	7.664	37.5	....
Lb. coal per 1,000 gross ton-miles	136	.....	....	....
Loco-miles per loco-days	35.3	49.0	....	27.9
Per cent freight locos. unserviceable	20.5	30.5	....	10.0
Per cent freight cars unserviceable	8.9	7.8	1.1	....

it had a much greater increase in traffic than did the Great Northern individually or the northwestern region as a whole. All of the roads of the United States reported an increase of 55 per cent. There is a bit more to the story than this. From the standpoint of the rate level the Great Northern is falling behind rather than advancing. Thus, the revenue per ton-mile in 1923 was 1.070 cents; in 1924, it was 1.064 cents, while in 1925 it had become 1.058 cents.

Due acknowledgment has been made above that these 1925 comparisons merely bring up to date similar comparisons made in an article appearing a year ago covering 1923 and 1924. The conclusion made then is the same as that which must be made now, namely that the Great Northern, like its neighbors in the northwestern region, has not had an increase in traffice in line with the rest of the roads of the country. Its rate level as compared with pre-war conditions is still out of line and the result of the lack of traffic combined with the low rate level has been that in spite of extremely large capital expenditures the Great Northern is now only earning the same amount of net operating income that it earned before the war when its property investment was much less than it is today. There is one redeeming feature in that while the net operating income of 1923 was only 86 per cent of the standard return and in 1924 only 84, in 1925 it was 99 per cent.

Increase in Gross Ton-Miles Per Train-Hour

The next question is to seek a solution of the Great Northern's ability to do sufficiently well—admitting nevertheless that with more traffic and a fairer rate level it might do still better—as to have earned in 1925, $8.56 a share on its stock and 5.12 per cent on its property investment. It is apparent that a considerable proportion of the explanation is to be found in Table III, giving a comparison of selected freight operating statistics. Figures are used for the first six months of 1926, the latest available, and comparison is made with the figures for the first half of 1920. It will be noted that the volume of traffic was less, there being a decrease of 2.3 per cent in gross ton-miles and of 11.7 per cent in net ton-miles. But at the same time, there were decreases of 27.0 in freight train-miles, of 35.8 per cent in freight train-hours and of 30.9 per cent in tons of coal consumed by freight locomotives. There were two reasons for these improved results, heavier train loading and improved train speed. The gross tons per train were increased 34.0 per cent, the net tons per train 21.0 per cent which, combined with the increase in the train speed from 10.2 miles per train hour to 11.6, effected the quite satisfactory result of increases of no less than 52.3 per cent in the gross ton-miles per train-hour and of 37.5 per cent in the net ton-miles per train-hour. With further reference to the gross ton-miles per train-hour it might be mentioned that in the first half of 1920 the Great Northern ranked fifth in the northwestern region whereas in the first half of 1926 it ranked fourth. Whereas it formerly trailed the Northern Pacific by a fairly wide margin, it now exceeds it.

Great Northern Traffic

It would appear that conditions in the eastern part of the Northwestern region have been rather more favorable than in the western part. The Great Northern's development is more in the eastern part than in the western. For example, in Minnesota it has twice the mileage of the second carrier in that state which is the Chicago, Milwaukee & St. Paul. The Great Northern, as a result, has a different kind of traffic from the other large roads in the region. Notably it has its large ore traffic which the Milwaukee and Northern Pacific or that portion of the Union Pacific in the region, do not have, while on the other hand, the Great Northern has a much smaller tonnage of lumber. The ore traffic in 1926 has been less than it was in 1925 due to the late opening of lake navigation. Products of mines, in 1925, constituted no less than 58 per cent of the revenue tonnage but because of its short haul it supplied only 21 per cent of the total freight revenues. Products of forests supplied a mere 12 per cent of the tonnage and because of the long haul made up a larger proportion of the freight revenues, namely, 17 per cent. It will be recalled that the Northern Pacific and Great Northern jointly own the Spokane, Portland & Seattle which in turn owns all the stock of the Oregon Trunk which is now endeavoring to arrange for the extension of its line into the virgin lumber country of the Klamath region of southern Oregon.

It must not be forgotten that agriculture remains the most important feature of Great Northern activity. In 1925, products of agriculture supplied 17 per cent of the tonnage and no less than 28 per cent of the freight revenue. Rate relationships are indicated in the fact that manufactures and miscellaneous which supplied only 11 per cent of the tonnage furnished 28 per cent of the freight revenues. One of the largest items appearing under the head of manufactures is refined petroleum which in 1925 constituted only 3 per cent of the total tonnage but which is expanding slowly in volume. It

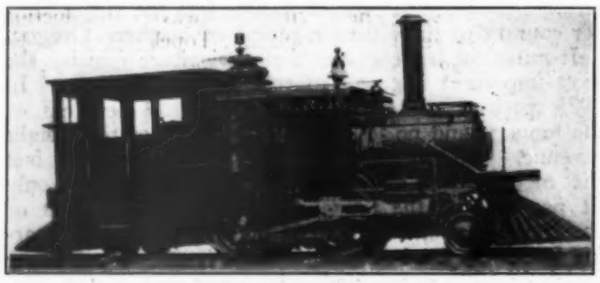
originates in the Kevin-Sunburst field in Montana and the oil from this field supplies a proportion of the road's locomotive fuel.

The Great Northern is favored from an operating standpoint because it crosses the Rocky Mountains at an altitude of but 5,202 feet and has less rise and fall than any of the other northern trans-continentals. In former years the road was pre-eminently a freight carrier but the present management has gone in more for passenger business. Its Oriental Limited is one of the best trains to the west coast. It is, of course, known that the Great Northern has been no exception from the standpoint of its loss of local passenger traffic. It has been progressive enough, however, to take steps to meet this situation and through the Northland Transportation Company operates a fleet of about 150 buses in Minnesota.

Capital Improvements

To one who studies the Great Northern possibly the outstanding factor of interest is the expenditure of the $97,800,000 in the past ten years for capital improvement. Net charges to investment in road in 1923 totaled 7½ million dollars and it is of interest that the third largest item, about one-tenth of the total, was for signals. In 1924 the company's net charges to investment in road totaled another 6 million and in 1925, 5 million. In the three years there was spent for signals a total of about $1,600,000. The main passenger route from St. Paul, Minn., to Seattle, Wash., is equipped with automatic signals and for 1,100 miles, or about two-thirds of the distance, with modern color light signals. The Great Northern in 1923 spent 18 million dollars for new equipment but retired equipment valued at 6 million leaving a net charge of 12 million. In 1924 there was spent 8 million but there were retirements of 10 leaving a net credit of 2 million. These large expenditures for new equipment were again supplemented in 1925 with a further expenditure of 12 million, retirements of 6, leaving a net charge of 6 million. For the three year period this means that there were net charges to investment in road of 18½ million and to investment in equipment of 16 million, or a total of both of 34½ million.

The most interesting improvement which the road has at present under way is the new 7.7 mile tunnel in the Cascades between Scenic, Wash., and Berne, in addition to which 24 miles of line will be electrified. The new tunnel will shorten the line 7.66 miles, save 1957 deg. of curvature, eliminate 13.33 miles of 2.2 per cent grade in favor of 1.57 per cent grade, eliminate 6.04 miles of snow-sheds, and the result will be that the Great Northern will cross the Cascades at an elevation of 2882 feet in place of the present 3383 feet. The work is now under way and is expected to be completed by the end of 1928. It will further assist the Great Northern in a continuation of the already extensive operating economies effected in recent years.



Built by the Cooke Works, Paterson, N. J.

Grain Rate Hearing Held at Minneapolis

TESTIMONY favoring and opposing the six-cent reduction in rail rates on grain and flour to the east as proposed in July by the Minneapolis & St. Louis and the Minneapolis, St. Paul & Sault Ste. Marie, was submitted at the hearing before the Interstate Commerce Commission on September 13 to 18 at Minneapolis and at Kansas City, beginning on September 20. The purpose of the hearing is to determine whether the rates sought by the carriers are reasonably compensatory and whether they are calculated to create a preferential situation for one market or district and discrimination against the interests of another. According to those favoring the reduction, the proposed rates which will permit Minneapolis mills and grain companies to compete more effectively with rival markets, will create a stronger and more active market for grain from the spring wheat belt of Minnesota, North Dakota and Montana. It is also felt that northwest farmers will share directly in the benefits to be derived from the milling and grain interests. Testimony showed that the present rate has diverted business from Minneapolis to such an extent that that city, which in 1917 handled 82.8 per cent of the wheat marketed in Minneapolis and Duluth, received 59.5 per cent in 1925. It was argued that the water rate on grain and flour from Duluth to Buffalo is practically the same as 20 years ago, while the all-rail tariff has jumped from 29 to 45 cents per cwt. Flour shipments from Minneapolis have declined from 17,964,545 bbl. in 1917 to 12,717,492 bbl. in 1925. At the same time, flour shipments from Buffalo have increased from 5,640,380 bbl. in 1917 to 9,458,142 bbl. in 1925. It was felt that the adjustment of the all-rail rate to the east is imperative if Minneapolis is to retain even the portion of the milling of northwest wheat which it now carries on. Opponents argued that if the reductions are approved concessions should be made for other territory.

C. T. Jaffray, president of the Minneapolis, St. Paul & Sault Ste. Marie, testified that during the past 20 years the quality of northwest wheat has deteriorated and this has had its effect on prices paid for grain. The competition between Minneapolis and other markets also has affected the prices of grain very materially. If the northwest did not have the big mills at its gateway in Minneapolis, northwest grain, frequently of off-grade quality, would sell at the minimum price provided by the state grades and at substantially lower prices than actually is the case. "Curtailment of the mill feed supply," he said, "is a direct and damaging blow at diversified farming in general and dairying in particular, which have been developed in the northwest through the expenditure of tireless effort and much money. The manufacture of northwest wheat into flour at Minneapolis means abundant and cheap mill feed for dairy cattle and other farm animals. On the other hand, continued decline in milling activities at Minneapolis and the increasing manufacture of northwest grain at Buffalo will result in less stock foods at higher prices to farmers in Minnesota and the neighboring states."

Frank B. Townsend, director of traffic of the Minneapolis Traffic Association, submitted exhibits to show that the proposed rate cuts are not only justified, but are made imperative by the competition of Duluth and Buffalo through the use of the Great Lakes water route. Mr. Townsend showed that even after the reduction, rates on grain would be considerably higher from Minneapolis to the seaboard than those on most other bulk

commodities which now move east through Minneapolis on a proportional rate basis.

William H. Brenner, receiver of the Minneapolis & St. Louis, presented a brief explanation of the existing rate which the all-rail rate cuts were designed to equalize. He pointed out that the cost of moving grain by way of the Great Lakes from Duluth to Buffalo is substantially the same as the pre-war cost, while the all-rail rate is more than 50 per cent higher. Duluth and Buffalo enjoy an advantage of some 15 cents per cwt., in respect to wheat grown in Montana, the Dakotas and northwest Minnesota, from Duluth by water to Buffalo, milled there and laid down in New York, as compared with northwest wheat milled in transit at Minneapolis and shipped all-rail to the seaboard.

Testimony presented by Charles C. Bovey, vice-president of the Washburn Crosby Company, and John S. Pillsbury, vice-president of the Pillsbury Company, showed that Minneapolis cannot continue to function as a milling center under the present freight rate adjustment, and is entitled to relief. Both men stated that their companies operate mills in Buffalo and the southwest, as well as Minneapolis. They testified that the present lineup has forced them to erect plants in Buffalo.

E. F. Rice, assistant general freight agent of the Minneapolis, St. Paul & Sault Ste. Marie, testified that in 1888, when the Soo Line published its first through rate on grain and flour to the east by way of Sault Ste. Marie, Minneapolis shipped 6,778,689 bbl. of flour, while none was manufactured at Buffalo. In 1906 Minneapolis shipped 14,898,689 bbl., while Buffalo, just entering the milling business on a large scale, moved out 2,347,500 bbl. In 1910, the figures were: Minneapolis, 15,680,260 bbl., and Buffalo, 3,764,850 bbl.; in 1917, Minneapolis, 17,964,545, and Buffalo, 5,640,380; in 1924, Minneapolis, 12,885,542, and Buffalo, 6,988,609; in 1925, Minneapolis,12,717,492, and Buffalo, 9,458,142. He also pointed out that Minneapolis at the present time has a milling capacity 90 per cent greater than Buffalo, but produces only 35 per cent more flour due to the curtailment of operations in Minneapolis. He showed the decline in grain receipts at Minneapolis and their increase at Duluth from 1917 to 1925. The receipts at Minneapolis during this period are: in 1917, 88.03 per cent; 1919, 82.52 per cent; 1920, 77.16 per cent; 1921, 70.98 per cent; 1922, 56.81 per cent; 1923, 62.91 per cent; 1924, 37.62 per cent; and 1925, 47.21 per cent. The differences between these percentages and the total of 100 per cent were received at Duluth.

C. A. Ross, rate expert of the Nebraska Railroad Commission, urged that if the reductions are approved Nebraska should receive parallel concessions as farmers, millers and grain interests in this territory will be affected adversely. He stated that if Minneapolis receives the rate reductions which are refused to Nebraska the state commission will file a complaint, alleging the Minneapolis rate to be preferential and in violation of the Interstate Commerce Act. John A. Kuhn, traffic manager of the Omaha Grain Exchange, testified that under the new rate Omaha would have to function under a rate handicap of 10½ cents per 100 lb. on shipments to Chicago. W. R. Scott, traffic commissioner of the Kansas City Board of Trade, stated that southwest millers competing with Minneapolis would have to sell flour at a six-cent disadvantage under the rate cut. H. O. Berger, traffic expert for the Washington State Department of Public Works, said he opposed the proposed tariffs because they would disrupt relations of long standing, would increase the spread between the rates on grain paid into the eastern markets by Oregon, Washington and Idaho over the rates on that raised further to the east, and because they would tend to reduce the revenues of the western carriers. Charles F. McDonald, secretary of the Duluth Board of Trade, declared that Duluth's growth as a grain market center has resulted from unusual crop conditions and not from cheaper rail-water-rail rates to the east.

Record-Breaking Freight Traffic

THE railroads this year are not only carrying the greatest freight traffic in their history, but are rendering to the shipping public the best service it has ever received from a transportation standpoint, according to a report submitted by the Car Service Division of the American Railway Association to the board of directors of that Association which met in New York on Friday, September 24. The volume of traffic on the basis of the number of cars loaded with revenue freight outstrips all previous years but this record freight movement is being handled without car shortage or other transportation difficulties.

For the first 37 weeks this year, 36,881,938 cars were loaded with revenue freight, an increase of 1,208,646 cars or 3.4 per cent over the best previous record made during the corresponding period last year. It also was an increase of 3,344,796 cars or 10 per cent over the corresponding period in 1924. The total for the first 37 weeks this year also exceeded by 1,177,552 cars or 3.3 per cent the estimate made last spring by the Car Service Division as to what freight traffic would be for that period in 1926.

Not only are fewer locomotives and freight cars in need of repair this fall than at any time in the past four years, but the railroads have approximately 5,600 serviceable locomotives in good repair and in storage while they also have nearly 142,000 surplus freight cars in serviceable condition which can be placed in use whenever needed. This situation has been made possible by a continued increase in efficiency in operation that in turn reacts to the benefit of the public.

Class I railroads on August 1 this year had 1,366 fewer locomotives than on January 1, 1923; there was, however, an actual increase of nearly 10 per cent in the average tractive power of the locomotives. There is an increase of 37,904 in the number of freight cars owned, the average capacity on August 1 this year being 45.06 tons or an increase of nearly five per cent compared with January 1, 1923.

In the record freight traffic that has been handled this year, loading of every commodity shows an increase over last year except live stock and forest products.

The movement of winter wheat in the southwest this season established a new high record for railroad performance. With the largest number of grain cars ever assembled in the loading district and surplus locomotives to give the loads prompt handling, the southwestern railroads were never better prepared for record movement than in 1926. The territory of heaviest production was chiefly served by the Atchison, Topeka & Santa Fe and the Chicago, Rock Island & Pacific. Owing to the fact the crop was greater than the most optimistic reports prior to that time had indicated and the fact that it was harvested by means of "combines" which enabled the wheat to be cut, threshed and sent to market in the same day, the railroads were confronted with a perfect avalanche of wheat which overwhelmed the country elevators and put a burden on the railroads in excess of any car supply that could be assembled. With all storage space and many

main line passing tracks full of empty cars, the railroads hardly could have been operated through this heavy wheat territory with many more cars in storage.

Realizing that the earlier supply of cars would soon be exhausted, the railroads concerned called on their connections and on the Car Service Division for further assistance. Hundreds of cars were delivered voluntarily to the Rock Island, Missouri Pacific and Santa Fe. Early in July the Car Service Division took control of the dispatch of box cars at Chicago and diverted every available empty box car fit for loading grain, regardless of ownership. This order was in effect for ten days and resulted in delivery to the Santa Fe of approximately 4,500 empty box cars. In addition, voluntary deliveries from Eastern and Western roads brought to that road a total of about 6,250 grain cars with 3,000 also to the Rock Island and 750 to Southwestern roads at St. Louis. This most gratifying and unanimous response by all railroads called upon made this remarkable record possible.

The following facts stand out in the resumé of the situation:

1. Car loadings of wheat exceeding previous high records by 57 to 84 per cent indicate a monumental achievement on the part of the railroads interested.
2. The absorption of unprecedented grain arrivals at Kansas City, Wichita, Hutchinson and Salina and at Galveston without congestion, unreasonable delay in disposition or even threat of embargo was an amazing record.
3. The complete support of the State Railway Commissions, particularly in Texas, Oklahoma and Kansas, to the efforts of the railroads to meet loading demands.
4. Substantial assistance was rendered by the various Shippers' Regional Advisory Boards in other parts of the country by directing public attention to the necessity of proper handling of box cars of western ownership.
5. The unanimous co-operation of the railroads in all parts of the country whose prompt action in delivering box cars to the wheat loading roads greatly aided in overcoming quickly a difficult situation.

Regarding the movement of coal and other commodities requiring the use of open top cars, the Car Service Division in its report pointed out that such loadings are continuing at high rate with the car supply entirely adequate for all purposes.

"Bituminous coal production," said the report "for the period January 1 to August 28 this year totals 353,505,000 tons which greatly exceeds the production during similar periods of the years 1925 and 1924 and is only about 17,000,000 tons behind the peak production during the year 1923. It is extremely difficult, if not impossible, to forecast what the total production for the year 1926 will amount to, but assuming it will be not less than 575,000,000 tons because of the English strike, the heavy lake program, the industrial activity at present existing, the usual seasonal increase incident to the fall and winter months, the railroads will be called upon to handle an average weekly production of 12,300,000 tons for the period August 28 to December 31, inclusive. The strike of English miners has greatly stimulated the demand for coal for export and for the period January 1 to July 31 this year 6,006,577 tons were exported through Atlantic ports as compared with 3,250,558 tons during the same period of 1925 and 3,032,826 tons during 1924.

"The forwarding of coal via the Great Lakes continues at a satisfactory rate and coal dumpings at lake ports from January 1 to August 29 amounted to 18,454,950 tons, which exceeds the dumpings during the same periods in 1924 and 1925, notwithstanding navigation this year opened practically three weeks later than usual because of ice conditions.

"The movement of coal to New England, all rail and rail and water from January 1 to July 31, this year, is slightly in excess of the movement for similar periods in 1924 and 1925 but is very much below the volume of tonnage handled during the first seven months in 1923.

"The loading of all commodities such as steel, sand, stone and gravel requiring the use of open top cars for the period from January 1 to August 31 this year, totaled 4,281,246 cars, an increase of 241,621 cars or 6 per cent as compared with the same period in 1925, and indications are that the loading will continue for some time at the present volume or slightly in excess thereof."

Hearing on B. R. & P. Lease

WASHINGTON, D. C.

A HEARING on the application of the Delaware & Hudson for approval and authorization by the Interstate Commerce Commission of a lease of the Buffalo, Rochester & Pittsburgh for 999 years was held on September 20 and 21 before Examiner Davis. The New York Central and Baltimore & Ohio, which had been negotiating for control of the B. R. & P., intervened in opposition and officers of the B. & O., testified as to the advantages they said would accrue from a closer co-ordination and consolidated operation of the two companies, while the New York Central introduced no witnesses but its counsel cross-examined the D. & H., witnesses.

The first witness for the applicant was H. G. Kelley, consulting engineer, who presented a description of the B. R. & P., property and the results of a study of its operations, expressing the opinion that the lease would result in an increase of net earnings which will produce probably in excess of the 6 per cent per annum guaranteed on the stock of the company. He also said it would be in the public interest by reason of the increased competition in service, by the more intensive use of the facilities, and by the lessened amount of new capital expenditures required. Mr. Kelley said the D. & H., is the only railway having an important interchange of coal and other traffic with the B. R. & P., not directly competitive with its principle article of traffic—coal. W. E. Eppler, comptroller of the Delaware & Hudson, introduced numerous exhibits regarding the performance of the two roads; George H. Burgess, valuation engineer, submitted an exhibit estimating the valuation of the B. R. & P., at $145,265,000, and J. E. Roberts, superintendent of transportation, testified as to the economies to be expected in the use of equipment.

Dr. Lewis H. Haney, professor of economics at New York University, expressed the opinion that the lease is prima facie desirable as being in the public interest and pointed out that there are "no clamoring minorities appearing to indicate that there has been any abuse of power by majorities." Dr. Haney made the points that the lease does not restrict competition, fits into the tentative consolidation plan proposed by the commission, and opens possibilities for desirable through routes. He said the capacity of the B. R. & P., as a whole is not fully utilized and that the lease offers advantages in relieving this situation, at the same time reducing to some extent the percentage of empty car mileage southbound.

The concluding testimony in support of the lease was given briefly by L. F. Loree, president of the Delaware & Hudson, who pointed out advantages to accrue to both properties and declared the plan would be in the public interest. He also said he expected an increase in the next few years in the traffic to be handled. He pointed

out that 80 per cent of the B. R. & P., stock had been voted in favor of the lease and 78 per cent of the D. & H., stock, without a negative vote.

George M. Shriver, senior vice-president of the Baltimore & Ohio, introduced in evidence the contracts under which the B. R. & P., uses the tracks of the B. & O. from Newcastle to Butler and its terminal facilities at Pittsburgh and said that the long-standing relations between the two companies indicate the desirability of even closer relations and a more complete co-ordination. The Baltimore & Ohio has a vital interest in the disposition of the B. R. & P., he said, because of the large interchange of traffic between the two roads and for several years the B. & O., has been dependent upon the B. R. & P., for a close connection with northern New York and Canada. He also pointed out that the contract by which the B. R. & P., uses terminal facilities of the B. & O., at Pittsburgh contains a clause which prohibits the B. R. & P., from assigning its rights to any other company without the consent of the B. & O., which it has not given. This he said, was intended to protect the B. & O., against just such a contingency as has arisen under the proposed lease. J. J. Ekin, comptroller of the Baltimore & Ohio, testified that economies amounting to $400,000 to $500,000 a year, or about 5 per cent of the B. R. & P., operating expenses, could be effected if the properties of the B. & O., and B. R. & P., could be operated together.

Daniel Willard, president of the Baltimore & Ohio, outlined the negotiations for control of the B. R. & P., by the Baltimore & Ohio and by the New York Central, which had been in progress for some time when the lease to the D. & H., was announced. He said that at one time there was talk of the New York Central controlling the road and selling or leasing some 60 miles to the B. & O. Mr. Willard said that control by the Delaware & Hudson would probably bring to an end the plan of the B. & O., for a new short route between Chicago and New York by the use of about 80 miles of the track of the B. R. & P., because with the D. & H., operating the B. R. & P., the situation would be "like having two drivers on one wagon."

Use of Printing Telegraphs by Railroads*

By J. O. Carr
Morkrum-Kleinschmidt Corporation

THE Morkrum printing telegraph was first installed by the Postal Telegraph-Cable Company in 1910, and the second installation was on the Burlington road. The Western Electric Company came into the field about 1913, and Kleinschmidt in 1917. Printing telegraphs did not make much progress until good Morse operators became scarce. Today, the Western Union has in operation more than 3,000 printer sets; the Postal 450; the Telephone Companies 1,400, and the railroads 100; also there are 900 sets in use in hotels and other fields. There are two general classes of service, regular message traffic and "inter-communication," the latter meaning short distance work supplanting the service of the telephone or messenger; as, for example, the typical plan of this kind, that on the Baltimore & Ohio at New York, which was described in the *Railway Age* of May 2, 1925, page 1095.

There are two general classes of printers (1), continuous synchronism systems and (2) start-stop systems. All of the first named class are multiplexed. These are more costly than the start-stop apparatus, but are necessary on long lines. The start-stop system can be operated either single or duplex, With it, a number of stations can communicate with each other without the necessity of any process of getting in step. The system is fully as flexible as a single line Morse circuit. With its type of synchronism, automatic switching apparatus can be used, as in telephone exchanges, to selectively connect with two or more stations.

Tape transmission is employed for long line telegraph work, or for any service where maximum capacity is the governing factor. With the short-distance apparatus the manipulation of the keyboard controls directly the transmitting contacts. With the tape perforator, an operator can make 1,200 operations a minute. Direct keyboard transmission is used with the start-stop system for short distances.

The telegraph companies now make extensive use of tape printers for message traffic, saving in first cost and possibly in cost of maintenance, though the need of more training of operators makes the use of the tape less desirable than page printers for railroad companies. Where several copies are to be made of received telegrams, the tape is not so convenient as the page printer. There are, however, many situations in railroad short-distance work where the tape printer can meet the requirements at less cost than the page printer.

With tape transmission a printer operator can handle nearly twice as many messages per hour as a Morse operator; that is, with a steady load, he can send from 50 to 60 words a minute. On composite telephone circuits generally the printer speed must be reduced to about 45 words a minute; still economy is secured by the ability of one operator to man both the sending and the receiving side of a duplex. Generally the printer is economical between points where the load is great enough to justify full Morse duplex operation during several hours of the day.

Printing telegraph apparatus today is far simpler than it was a few years ago, but the employee who maintains it must have adequate instruction. A well-trained man can take care of a duplex printer terminal with an average expenditure of 1½ hours a day. An intelligent wire chief, properly instructed, can easily maintain one or two duplex printer terminals. [Mr. Carr discussed automatic switching apparatus at length, describing various complicated hook-ups. A great variety of arrangements can be used from a simple arrangement of cam keys and relays to more complicated situations where as many as 50 machines may be inter-connected in all sorts of combinations. A certain bank has had in use for three years a dial-controlled automatic switching apparatus by which fifteen printers communicate with each other and with any idle one of four other machines. One installation in a hotel has been in successful operation for two years and controls 50 printers.]

Railroads Using Printers

The Atchison, Topeka & Santa Fe has two tape transmission duplexes between Chicago and Topeka and a multiplex circuit between Topeka and Los Angeles.

The Baltimore & Ohio operates a direct keyboard duplex circuit between Baltimore and Cincinnati and a local circuit in New York City.

The Chicago, Burlington & Quincy has a tape transmission duplex between Chicago and St. Paul and one between Chicago and Omaha.

*Abstract of a paper read before the Telegraph and Telephone Section of the American Railway Association at Swamscott, Mass., on September 22.

Cleveland, Cincinnati, Chicago & St. Louis: Indianapolis and Cincinnati.

Illinois Central: Chicago and Memphis, Chicago and New Orleans, Memphis and New Orleans; also three local circuits in and near Chicago.

Indiana Harbor Belt: at two hump yards.

Louisville & Nashville: Louisville and Nashville, Nashville and Montgomery.

New York Central: six keyboard circuits in the Marine Department, New York City.

Pennsylvania: tape transmission duplexes as follows: Philadelphia-Pittsburgh (two circuits); Philadelphia-Chicago; Philadelphia-Harrisburg; Chicago-Columbus; Chicago-Indianapolis; Chicago-Pittsburgh; Pittsburgh-Cleveland; Pittsburgh-Columbus; also a local circuit at Philadelphia, one transmitting station and six receiving stations, for telegraphing the make-up of passenger trains.

Southern Pacific: San Francisco and Los Angeles; San Francisco and Ogden.

St. Louis-San Francisco: direct keyboard duplex circuits between Springfield, Mo., and Sapulpa, Okla., also between Springfield, Mo., and Memphis, Tenn.

Union Pacific: This company has practically all of its heavy telegraph circuits equipped with multiplex, as follows: Omaha-Chicago; Omaha-Kansas City; Omaha-Cheyenne; Omaha-Denver; Omaha-Salt Lake City; Omaha-Ogden; Salt Lake City-Portland; Salt Lake City-Los Angeles. In addition to these there is a tape transmission duplex between Salt Lake City, Utah, and Pocatello, Idaho. All of these use page printers.

The Canadian Pacific and the Canadian National are large users of printing telegraphs for commercial business.

W. G. Edens Addresses Western Railway Club

THE first fall meeting of the Western Railway Club was held at the Hotel Sherman, Chicago, on Monday evening, September 20. The principal address was made by Col. W. G. Edens, vice-president of the Central Trust Company, Chicago, who discussed the general subject, "Serving the Public, the Key to Successful Railroad Operation," this address being preceded by the usual "Dutch treat" dinner which proved such a successful feature of the Western Railway Club meetings during last season.

Col. Edens spoke in part as follows:

"Because the railroads have gradually recovered from the stultification which hindered them as a result of too much governmental control over too long a period, growing out of the war, they are rendering better service than ever before and their stockholders, officers and employees are beginning to see better times. This condition, I believe, is due to the fact that their operation and management have been restored to the ingenuity and initiative of their personnel from the ground up. Outside management such as that under governmental supervision, which begins at the top and goes down, cannot compare with inside management, which goes both up and down.

"The rule of order now in the railroad industry is service to customers. The roads which have the most highly developed service are those which are succeeding the fastest. I believe this will not be disputed by any railroad of standing.

"In the old days our railroads were pictured as tyrannical organizations with a rule or ruin policy toward communities and business organizations. Happily, this idea has disappeared and the business man now regards the railroad as an institution which wishes to co-operate with him in the extension of his industry in order that it might have its proper share of his prosperity.

"Personally I know of many fine things that have been accomplished by the regional conferences between railroad representatives and representatives of business organizations over the handling of traffic and the massing of cars in regions where there was demand.

"Few people realize that we have less mileage of steam railroads today than we had ten years ago. The latest figures I have been able to find show that there were 250,003 miles of railroad trackage on December 31, 1924, against 254,251 miles on January 30, 1916, a falling off of 4,248 miles.

"The railroads have been quick to appreciate the importance of the motor bus and all over the country they are adopting the motor bus lines as feeders for their long-haul business. Here we have an excellent example of service to the traveling public."

Rust-Proofing Spring Washers

THE National Lock Washer Company, Newark, N. J., has adapted the Parkerizing process of rust-proofing metals to its spring washers to make them entirely non-corrosive. The railroads have long recognized the seriousness of the problem of overcoming the corrosion of track materials, particularly at the joints, and they have spent vast sums of money to develop and to utilize means of preventing this corrosion and thereby prolonging the life of the component parts of their track.

The National Lock Washer Company started research work for the purpose of rust-proofing its spring washers and especially its Improved Hipower spring washers about five years ago. As a result of this work and of extensive tests in the laboratory and shop and in actual service in the track, it was found that while many expedients could be employed to make the spring washers rust-proof, the majority of these processes produced only temporary results. Of the various permanent methods that can be employed, the majority were found to so affect the physical properties of the steel as to eliminate them from consideration for this purpose.

For the past three months the National Lock Washer Company has been working with the Parker Rust-Proof Company in an effort to adapt the Parkerizing process to spring washers as a result of which it has been ascertained that this process, for all practical purposes, produces permanent results and at the same time does not affect the physical properties of the steel in the spring washers. The Parkerizing process differs from most rust-proofing processes in that basically it is not a plate but the actual skin of the material that is Parkerized is converted into a basic iron phosphate which is impervious to rust or corrosion.

A MEETING OF 500 representatives of shippers and carriers, called under the direction of the Illinois Commerce Commission, was held at the Hotel LaSalle, Chicago, on September 10, to discuss the adjustment of class rates in western trunk line territory. During the meeting, the "steering committee" of the shippers and the counsel committee of the railroads asked that the commission postpone its hearing for 90 days while the two groups attempt to reach a mutual agreement on a new class rate schedule.

General News Department

The Missouri Pacific and the Denver & Rio Grande Western will consolidate their engine shops and freight yards at Pueblo, Colo., before October 1.

All officers of the American Association of Freight Traffic Officers were re-elected at the annual meeting held at French Lick, Indiana, on September 18.

The Cleveland Steam Railway Club will hold its next meeting on October 4, at the Hotel Hollenden, at which time Roy V. Wright, managing editor of the *Railway Age*, will deliver an address on Improving the Standards of Supervision.

The Sesqui-Centennial Exposition at Philadelphia is holding a series of "world's railroad athletic championship meets." Many railroad employees will compete in the exposition stadium in track and field events on September 25. Other contests—such as swimming, tennis and trap shooting—were staged on the 23rd and 24th.

The Pullman Company will add 200,000 sq. ft. of floor space to its Calumet, Ill., repair shops, at a cost of approximately $1,250,000. Plants, office buildings, laundry and oil houses will be enlarged through the construction of several small buildings and additions. Electrical equipment and other machinery will be purchased.

Cost of Crockery Replacement on Southern Pacific Diners

The cost of replacing crockery on dining cars of the Southern Pacific during 1925 amounted to $44,000, or 1.6 cents per meal for each of the three million meals. This is a reduction of four-tenths of a cent per meal over the previous year, and a saving of $11,000.

Railway to Celebrate Centennial

The 100th anniversary of what is said to be the first railway operated on rails in America will be celebrated at Milton, Mass., from October 10 to 12. The line is known as the Granite Railway and was opened on October 7, 1826, as a tramway to haul granite blocks used in the construction of the Bunker Hill Monument. The governor of Massachusetts, the mayor of Quincy, and A. P. Russell, vice-president of the New York, New Haven & Hartford, will make addresses on October 12 at the occasion of the unveiling of a commemorative bronze tablet.

New York Central Track Meet at Toledo

The third annual track meet of the 55 New York Central athletic associations was held at Scott High School stadium, Toledo, O., on September 18. Approximately 12,000 persons, mostly employees and their families from nearly every part of the New York Central, were present. The Michigan Central association was the winner. President P. E. Crowley and other officers of the New York Central were in attendance. One of the features of the day was the playing of six employee bands. The Michigan Central athletes scored 42 points, while second and third places were closely contested, the Buffalo association netting 14 points for second place, and the Cincinnati association taking third place with 12 points.

C. & O. Veterans' Meet

The tenth annual meeting of the Veteran Employees Association of the Chesapeake & Ohio was held at the State Fair Grounds at Richmond, Va., on September 18. More than 3,000 members are reported to have been present. President Harahan in his address said there were 64 men who had been in active service on the road or on the pension roll for a period exceeding 50 years. These men were presented with appropriate gold pins, set with a diamond. Music was furnished by the Clifton Forge and Hinton bands. W. A. Davies, of Huntington, W. Va., was elected president of the association.

Missouri Pacific Operates Better Health and Agricultural Special

The Better Health and Agricultural Special of the Missouri Pacific left Monroe, La., on September 13, for a 15-day tour of southern Louisiana and the Gulf coast to promote better health and agricultural conditions in this territory. The train will finish its tour at Baton Rouge, La., on October 5. The equipment consists of two exhibition cars and a moving picture car. One of the cars shows the medical development in typhoid and malaria control and the other contains exhibits of improved agricultural devices of special interest to Louisiana farmers. Lectures on health and agriculture will be given at all towns along the route, the lectures being demonstrated with the aid of moving pictures.

Wage Statistics for June

The Interstate Commerce Commission's summary of reports of wage statistics filed by Class I steam roads shows a total of 1,833,621 employees as of the middle of June, 1926, an increase of 24,893, or 1.4 per cent over the number for the previous month. The total compensation $249,055,495 shows an increase of $2,518,261, or 1.0 per cent. The number of employees reported in June, 1926, in comparison with the returns for the corresponding month last year, shows an increase of 2.9 per cent. The compensation increased 3.8 per cent. The greater percentage increase in compensation is due principally to an increase in the average number of hours worked per employee.

The number of employees at the middle of the month was as follows:

Group	June, 1926	Increase over May, 1926	Increase over June, 1925
Executives, officials and staff assistants	16,803	(d) 3	367
Professional, clerical and general	285,376	1,293	3,566
Maintenance of way and structures	458,306	21,764	35,933
Maintenance of equipment and stores	516,753	451	(d) 1,250
Transportation (other than train, engine and yard)	209,525	2,111	1,263
Transportation (yardmasters, switch tenders and hostlers)	24,028	14	271
Transportation (train and engine service)	322,830	(d) 737	11,775
Total	1,833,621	24,893	51,925

(d) Decrease.

55,000 Witness P. R. R. System Athletic Meet

The Pennsylvania held its sixth annual outdoor athletic meet in the stadium of the Sesqui-Centennial at Philadelphia on September 18. It is estimated that 55,000 people witnessed the sports in which 1,085 employee athletes participated.

President W. W. Atterbury was accompanied by Mayor Kendrick at Philadelphia, together with the official families of each. Spectators among the railroad employees traveled by special train from as far as Chicago and St. Louis. The gates of the new stadium were opened to everyone visiting the Sesqui-Centennial that day. The trial events were conducted in the morning and the finals in the afternoon. Eighteen P. R. R. bands played.

A baseball game, the first in the series to determine the system's championship team was played as a conclusion of the day's activities. The railroad has been divided into the western section and the eastern section for elimination purposes, the Columbus, Ohio, shop team representing the former, while the

Altoona Works team represented the eastern section. In a closely contested game the Columbus team defeated the Altoona Works team by a score of two to one.

A series of three games is scheduled and the winner will represent the Pennsylvania in the inter-railroad contest between the New York Central championship team and the Pennsylvania championship team in a game to be played in Indianapolis on October 2.

N. Y. C. Safety Special Tours Western Lines

The New York Central Lines is at present operating over the western portion of its system a "Safety Special" train in charge of Charles E. Hill, general safety agent of the lines. The tour, which is to last five weeks, started on September 8 from La Salle street station, Chicago, and will terminate in Indianapolis after covering the New York Central west of Buffalo, the Cincinnati Northern, the Big Four, the Peoria & Eastern and parts of the Michigan Central.

The tour includes stops at all principal shops and roundhouses on the route taken, with side trips taking in branch lines. In all more than 100 rallies will be held with audiences of employees, ranging in number from 150 to 4,000. The schedule calls for 23 divisional safety committee meetings and numerous outside addresses at chambers of commerce, schools and automobile clubs. With Mr. Hill on the trip is W. F. Johnson, supervising safety agent, who planned the schedule which to date has worked out perfectly.

The train consists of a private car, a club car and a standard day coach. It carries a crew of seven colored chefs, porters and entertainers besides the regular train crew. Four of these make up a quartette, "Deacon Johnson's Singers" of New York, who provide entertainment.

The train has been the object of great interest in its tour thus far. In practically all cities it encounters along its route the mayor and numerous other public officials and prominent citizens attend the rallies. It encountered similar success last year in its tour of the Lines East of Buffalo.

OPERATING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 185 Steam Roads, Including 13 Switching and Terminal Companies)

For the Month of July, 1926 and 1925

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1926	1925	1926	1925	1926	1925	1926	1925	1926	1925
Average number of miles operated	236,879.54	236,594.77	59,260.68	59,473.89	5,554.34	5,544.79	38,901.68	38,717.75	133,162.84	132,858.34
Revenues:										
Freight	$408,644,952	$377,521,634	$176,916,908	$168,977,111	$22,725,288	$19,113,535	$53,514,597	$49,101,619	$155,488,159	$140,329,369
Passenger	a 97,786,878	b 97,966,503	50,471,451	49,802,474	1,890,440	1,896,156	12,356,566	12,585,544	33,068,421	33,682,329
Mail	7,809,707	7,789,870	3,007,622	2,988,013	201,804	200,583	1,175,904	1,111,811	3,424,377	3,489,463
Express	10,919,088	9,972,337	5,147,602	4,592,746	242,022	230,150	1,133,859	1,282,904	4,395,605	3,866,537
All other transportat'n	18,127,159	17,090,835	10,398,528	9,851,821	271,296	208,264	852,276	853,611	6,605,059	6,177,139
Incidental	12,462,106	11,436,928	6,110,711	5,538,333	516,162	338,190	1,124,071	1,056,834	4,711,162	4,503,571
Joint facility—Cr.	1,227,847	827,831	465,155	320,409	14,180	15,857	133,698	136,791	614,814	354,774
Joint facility—Dr.	462,797	121,757	137,591	d 11,092	1,985	2,073	35,891	35,311	287,330	95,465
Ry. operat'g revenues	556,514,940	522,484,181	252,380,386	242,081,999	25,859,207	22,000,662	70,255,080	66,093,803	208,020,267	192,307,717
Expenses:										
Maintenance of way and structures	80,335,653	75,035,380	34,004,371	31,360,357	3,494,213	3,296,002	10,836,547	10,052,755	32,000,522	30,326,266
Mainten'ce of equipm't	106,634,089	105,258,040	51,609,927	50,525,288	4,855,579	5,144,146	13,768,845	13,231,159	36,399,738	36,357,447
Traffic	9,871,084	9,059,832	3,620,370	3,400,132	241,642	225,268	1,623,701	1,538,020	4,385,371	3,896,412
Transportation	179,685,545	175,229,948	84,164,909	82,227,032	6,296,116	5,837,663	23,997,673	22,646,882	65,226,847	64,518,371
Miscellaneous operat'ns	5,075,413	4,922,269	2,233,726	2,076,656	85,840	80,616	482,307	427,778	2,273,540	2,337,219
General	15,313,893	14,620,302	6,996,883	6,438,190	507,076	472,788	1,994,872	1,912,945	5,815,062	5,796,379
Transportation for investment—Cr.	1,621,813	1,200,982	193,490	181,459	67,274	103,079	295,143	145,477	1,065,906	770,967
Ry. operat'g expenses	395,293,864	382,924,789	182,436,696	175,846,196	15,413,192	14,953,404	52,408,802	49,664,062	145,035,174	142,461,127
Net revenue from railway operations	161,221,076	139,559,392	69,943,690	66,235,803	10,446,015	7,047,258	17,846,278	16,429,741	62,985,093	49,846,590
Railway tax accruals	34,669,495	30,748,106	14,681,197	13,497,250	1,949,386	1,299,702	4,381,972	3,852,942	13,656,940	12,098,212
Uncollectible ry. rev's.	133,212	136,879	57,814	66,338	3,832	3,891	15,712	22,892	55,854	43,758
Ry. operating income	126,418,369	108,674,407	55,204,679	52,672,215	8,492,797	5,743,665	13,448,594	12,553,907	49,272,299	37,704,620
Equipm't rents—Dr. bal.	7,290,174	7,028,552	3,879,971	4,094,409	d 613,746	d 629,890	363,937	310,222	3,660,012	3,253,811
Joint facility rent—Dr. balance	2,232,883	1,977,243	1,238,387	888,537	83,577	96,413	109,493	139,748	801,426	852,545
Net railway operating income	116,895,312	99,668,612	50,086,321	47,689,269	9,022,966	6,277,142	12,975,164	12,103,937	44,810,861	33,598,264
Ratio of expenses to revenues (per cent)	71.03	73.29	72.29	72.64	59.60	67.97	74.60	75.14	69.72	74.08

For Seven Months Ended with July, 1926 and 1925

Average number of miles operated	236,875.38	236,592.48	59,338.71	59,529.59	5,547.39	5,538.47	38,893.90	38,703.62	133,095.38	132,820.80
Revenues:										
Freight	2,649,218,994	2,498,260,803	1,184,589,530	1,127,158,298	139,209,713	121,524,480	380,893,881	350,886,342	944,525,870	898,691,683
Passenger	c 602,427,298	e 596,910,282	297,947,467	293,758,459	12,812,705	13,110,343	92,983,130	86,901,711	198,683,996	203,139,769
Mail	55,221,501	55,880,320	20,938,881	21,438,727	1,458,510	1,470,724	8,332,383	8,012,024	24,491,727	24,958,845
Express	81,157,197	79,462,783	38,294,404	37,684,384	1,780,706	1,897,218	11,437,432	11,646,884	29,644,655	28,234,297
All other transportat'n	118,199,529	113,595,611	67,023,419	64,739,521	1,534,722	1,408,845	7,016,764	6,654,851	42,624,624	40,792,394
Incidental	73,687,389	69,806,450	37,089,176	34,459,970	2,882,383	2,400,925	9,377,553	8,450,903	24,338,277	24,494,652
Joint facility—Cr.	7,605,968	5,969,192	3,062,188	2,618,641	97,384	114,360	990,701	940,984	3,455,695	2,295,207
Joint facility—Dr.	2,777,959	1,378,942	927,909	570,478	15,671	15,013	236,631	239,697	1,597,748	553,754
Ry. operat'g revenues	3,584,739,917	3,418,506,499	1,648,017,156	1,581,287,522	159,760,452	141,911,882	510,795,213	473,254,002	1,266,167,096	1,222,053,093
Expenses:										
Maintenance of way and structures	493,407,502	463,360,172	206,637,287	195,084,266	21,797,191	19,973,402	72,766,052	67,331,016	192,206,972	180,971,488
Mainten'ce of equipm't	747,442,390	735,387,456	360,541,741	354,806,127	34,339,547	34,325,389	98,639,308	92,287,726	253,921,794	253,968,214
Traffic	65,764,611	60,737,016	23,831,539	22,512,129	1,715,323	1,583,438	11,839,157	10,848,877	28,378,592	25,792,572
Transportation	1,256,763,669	1,237,479,048	595,720,970	584,567,092	42,534,223	40,617,885	178,521,629	165,914,405	439,986,847	446,379,666
Miscellaneous operat'ns	32,390,542	30,493,863	14,932,299	13,898,219	653,175	621,293	4,156,671	3,648,309	12,648,397	12,326,042
General	107,858,999	101,491,322	49,596,969	44,851,169	3,525,454	3,305,860	13,965,184	13,215,340	40,771,392	40,118,953
Transportation for investment—Cr.	8,825,975	6,650,723	1,062,445	1,036,120	264,511	330,486	1,719,764	1,128,414	5,779,255	4,155,703
Ry. operat'g expenses	2,694,801,738	2,622,298,154	1,250,198,360	1,214,682,882	104,300,402	100,096,781	378,168,237	352,117,259	962,134,739	955,401,232
Net revenue from railway operations	889,938,179	796,208,345	397,818,796	366,604,640	55,460,050	41,815,101	132,626,976	121,136,743	304,032,357	266,651,861
Railway tax accruals	217,128,465	199,658,107	89,312,846	82,976,311	11,146,578	8,737,087	30,378,354	27,172,453	86,290,707	80,772,256
Uncollectible ry. rev's.	952,552	1,001,107	471,051	464,294	23,089	35,546	112,783	133,802	345,629	367,465
Ry. operating income	671,857,162	595,549,131	308,034,899	283,164,035	44,290,383	33,042,468	102,135,859	93,830,488	217,396,021	185,512,140
Equipm't rents—Dr. bal.	46,138,434	43,071,352	26,542,170	24,800,014	d 4,479,913	d 3,445,415	8,753,163	5,566,705	15,323,014	16,150,048
Joint facility rent—Dr. balance	13,865,095	13,293,733	6,341,279	6,153,840	668,798	640,595	843,051	819,165	6,011,967	5,680,133
Net railway operating income	611,853,633	539,184,046	275,151,450	252,210,181	48,101,498	35,847,288	92,539,645	87,444,618	196,061,040	163,681,959
Ratio of expenses to revenues (per cent)	75.17	76.71	75.86	76.82	65.29	70.53	74.04	74.40	75.99	78.18

a Includes $3,774,885 sleeping and parlor car surcharge. b Includes $3,527,074 sleeping and parlor car surcharge. c Includes $23,796,720 sleeping and parlor car surcharge. d Deficit or other reverse items. e Includes $21,862,817 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

During the 14 years that organized safety work has been in force on the New York Central, employee fatalities have been cut 63 per cent in the face of a large increase in the number of employees and business handled, with its attending complexities and increasing hazards.

Railway Fire Protection Association Meeting

The annual meeting of the Railway Fire Protection Association will be held at New Orleans, La., on October 12, 13 and 14. The reports of the committees to be presented and discussed will include the executive, the auditing, the publicity, statistics, storage of records, motor transportation, revision of fuel oil, fuel oil and water and pyroxylin lacquer, hazards growing out of the use and operation of acetylene apparatus on railroad property, hazards surrounding the handling, transportation and storage of cotton. Charles N. Rambo, manager of the Railroad Insurance Association, will address the meeting on "How a Railroad Can Make Use of the Services of Its Fire Underwriters." "The Human Element in Fire Prevention" will be discussed by Robert Scott, director, Department of Insurance and Safety, of the Atlantic Coast Lines. L. C. Bentley, general safety agent of the Chesapeake & Ohio, will speak on the subject, "Spending Money to Make Men." The program will also contain an open discussion of field practice on fire prevention and protection and the election of officers.

Heavy Rainfall Damages Railroad Property

Heavy rainfall resulted in considerable damage to railroad property in northwestern Iowa and southeastern South Dakota on September 18 and 19, when between 5 and 7 in. of rain fell. At Hawarden, Iowa, and Maurice on the Chicago & North Western two bridges were washed out and considerable trackage was inundated and undermined. The damage was so great that the bridge at Hawarden was not restored to service until September 23, and that at Maurice could not be placed in service until September 30. As a result of the washout, trains en route from Omaha, Neb., to Jamestown, S. D., were tied up until they could be routed over the tracks of the Chicago, Milwaukee & St. Paul. Service on several branch lines in this territory also was discontinued temporarily. In South Dakota two bridges and considerable trackage of the Chicago, Milwaukee & St. Paul was affected and service was interrupted for 10 hours until the water receded and the endangered line repaired. A bridge was endangered and 1,400 ft. of line was undermined at Kellogg, Iowa, on the Chicago, Rock Island & Pacific. As a result, trains between Chicago and Denver, Colo., could not use the main line at this point from the morning of September 19 until the evening of September 20. Washouts, slides and endangered bridges on the Chicago Great Western between Omaha, Neb., and Harlan, Iowa, interrupted service 24 hours.

Coroner's Jury Blames Engineman for Northwestern Wreck

Louis J. Smith, the engineman of the Chicago & North Western locomotive which ran into a suburban train at Clybourn station, Chicago, on September 6, and caused the death of five persons and the injury to 50 others, was blamed for the wreck by a coroner's jury investigating the accident. Smith was held to the grand jury on five charges of manslaughter, while other members of the train crew were absolved of blame. A like verdict was returned in each of the five deaths, each recommending that Smith be held to the grand jury on charges of manslaughter until discharged by due process of law.

In its decision, the jury also recommended that the railroads of the United States adopt a rule requiring the regular periodical medical examinations of all employees engaged in the operation of trains. This was made because the records introduced into evidence showed a lack of frequent examinations of trainmen. The jury found, however, that Smith's physical condition did not enter into the causes of gross and criminal negligence. The charges of negligence were based on testimony that Smith did not slow his train down to a "crawl" when a caution signal was prominently displayed and understood by him. The verdict further stated that the preceding train had passed the second train a few minutes before and was at no great distance ahead on the same track.

In its investigation of the wreck the jury also considered the use of wooden cars. R. N. Van Doren, vice-president, testified that the North Western was gradually discontinuing the use of wooden cars. At the present time, he said, 54 per cent of the cars in operation by the North Western are steel, while at the present time there are 22,685 wooden passenger cars in use on all the railroads in the country. He estimated that it would cost approximately $506,734,000 to junk them and replace them with steel cars.

The Railroads in the Hurricane Region

Of the principal railroads serving that section of the South affected by the tropical hurricane on September 18, 19 and 20, the Louisville & Nashville was apparently the most unfortunate in point of property damage. President W. R. Cole telegraphed the *Railway Age* as follows:

"Tropical storm struck L. & N. territory in vicinity of Pensacola and Mobile on the 19th and 20th. Slight damage to property and tracks at Mobile, not exceeding $6,500 loss. Line Flomaton to Mobile damaged as result of heavy rains. Expect to have this portion of line open by Thursday night. Serious damage at Pensacola—roundhouse, shops, wharves, and freight depot badly damaged; roof passenger station blown off; main track between Pensacola and Escambia Bay, approximately 8 miles, washed out; estimated damage, $800,000. Account incomplete reports, unable to state when through service via Pensacola will be resumed. Have detour line which will be in operation by Friday night." A subsequent telegram from President Cole stated that a closer inspection at Pensacola developed that the figure of damage reported earlier was excessive; $500,000 would be more accurate, exclusive of track damage between Pensacola and River Jct.

The Florida East Coast and the Seaboard Air Line, which serve the section first hit by the storm, report relatively little damage. H. N. Rodenbaugh, vice-president of the Florida East Coast, on September 22 sent the following telegram:

"The Florida East Coast Railway was not damaged by storm. There was some delay to train operation due to trains being held at terminals during storm period, but we are now back to normal conditions and operating regular on time service, moving supplies and doctors and nurses to the devastated region and are in shape to handle all business offered."

The following telegram was received from M. H. Cahill, vice-president of the Seaboard Air Line:

"Service to all principal points in Florida over Seaboard Air Line Railway unimpaired throughout storm, except into West Palm Beach, which line was out of commission for about one day. This line in full operation since Sunday night. Damage of considerable proportion by storm and high water on several of our branch lines, major part of which has been repaired, except extreme south end of line leading into Boca Grande, on West Coast, which will require several days for complete rehabilitation. From this railroad's property standpoint, damage in money and area much less serious than general reports have indicated."

S. Davies Warfield, president of the Seaboard Air Line, gave out a formal statement in New York on September 22, which read in part as follows:

"Our reports from all territory are in hand this morning not only in respect to the railroad but the storm damage to the communities reached by the hurricane southeast of Pensacola, which point the railroad does not reach except through its connections.

"While it is not unusual for first dispatches in a case of this kind to be somewhat hysterical, the press dispatches dealing with the affected territory during the last three days have been exaggerated to an extent far beyond actual conditions. While the loss of life entailed is most unfortunate and regrettable, our information is that buildings erected under modern methods of architectural design and construction have withstood the tempest in admirable shape, the damage being local, such as plate glass and this class of damage. The most significant illustration I can give of the exaggerated accounts is that motor bus service between Miami and West Palm Beach, 67 miles, is on schedule time, not possible were the havoc sustained which many accounts have stated has been sustained. These buses cross many canals on bridges and several rivers by bridges over a road which lies

(*Continued on page* 574)

Freight Operating Statistics of Large Steam Roads—Selected Items for July, 1926, as

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1926	407	231,698	247,303	26,206	5,140	67.4	266,948	103,346	118	20	14.6	19
	1925	404	251,016	273,191	32,752	5,242	67.8	272,805	106,255	127	15	10.8	11
Boston & Maine	1926	2,143	466,715	543,064	50,865	12,537	69.8	633,184	259,307	311	88	22.0	46
	1925	2,253	509,258	582,969	57,535	12,682	70.5	636,983	261,654	346	93	21.1	49
N. Y., New H. & Hartf.	1926	1,892	508,306	533,597	33,728	14,249	67.7	732,602	293,437	284	50	15.0	26
	1925	1,892	507,947	530,784	38,386	13,974	68.3	720,892	295,036	287	59	17.1	29
Great Lakes Region:												
Delaware & Hudson	1926	875	393,491	529,479	54,557	11,107	63.9	708,449	348,990	250	36	12.6	73
	1925	875	398,686	538,082	55,776	10,701	64.9	691,590	349,698	247	40	14.0	73
Del., Lack. & Western	1926	999	566,218	659,199	89,159	18,055	68.5	1,027,304	459,665	262	53	16.7	25
	1925	993	570,926	622,507	85,550	17,687	69.6	992,269	451,067	291	58	16.7	44
Erie (inc. Chic. & Erie)	1926	2,323	967,344	1,061,706	119,150	36,683	64.8	2,206,067	934,596	566	109	16.1	130
	1925	2,325	921,884	1,019,625	100,112	34,989	65.6	2,100,663	930,716	616	111	15.3	203
Lehigh Valley	1926	1,346	593,109	652,092	71,575	18,689	64.9	1,120,669	513,203	397	81	17.0	51
	1925	1,357	596,231	657,495	75,409	18,354	66.3	1,089,343	504,580	429	84	16.3	91
Michigan Central	1926	1,835	577,954	594,167	20,735	19,301	61.6	1,081,500	387,141	262	48	15.4	70
	1925	1,826	554,324	571,783	17,016	19,155	61.4	1,035,988	370,226	313	41	11.7	117
New York Central	1926	5,482	1,988,516	2,253,166	145,474	76,060	62.8	4,598,186	2,003,371	1,214	298	19.7	401
	1925	6,478	1,927,152	2,152,334	147,942	71,031	63.4	4,315,825	1,863,631	1,194	351	22.7	368
New York, Chic. & St. L.	1926	1,665	611,280	618,108	4,655	19,638	65.8	1,074,863	418,197	237	53	18.4	51
	1925	1,669	618,151	627,277	5,087	19,287	65.1	1,058,765	410,508	241	63	20.8	57
Pere Marquette	1926	2,179	436,516	443,605	6,652	10,669	61.3	633,996	261,893	189	26	12.0	18
	1925	2,198	384,427	395,305	7,997	9,046	63.1	517,247	224,509	187	22	10.4	34
Pitts. & Lake Erie	1926	231	133,976	135,576	1,509	4,777	65.2	370,404	216,054	61	20	24.7	13
	1925	231	119,216	121,421	1,105	4,078	64.7	313,176	181,809	72	19	20.7	32
Wabash	1926	2,497	714,850	739,605	10,568	22,475	68.6	1,233,221	509,532	321	58	15.3	74
	1925	2,497	659,010	686,450	12,122	21,637	68.5	1,175,447	483,448	328	63	16.0	85
Central Eastern Region:												
Baltimore & Ohio	1926	5,197	1,979,595	2,275,542	187,425	58,498	62.3	3,860,717	1,869,755	1,044	194	15.7	151
	1925	5,196	1,852,773	2,154,936	165,279	54,732	64.0	3,510,907	1,711,763	1,000	263	20.8	120
Central of New Jersey	1926	691	261,154	275,807	22,352	7,991	59.3	518,667	252,940	223	39	14.7	44
	1925	691	295,478	324,684	39,768	7,511	59.9	489,386	236,049	243	34	12.1	38
Chicago & Eastern Ill.	1926	945	251,853	253,354	3,940	7,283	65.1	419,416	188,847	128	37	22.2	54
	1925	945	229,259	229,558	3,550	6,446	64.3	370,435	167,330	142	26	15.2	71
Clev., Cin., Chic. & St. L.	1926	2,374	741,781	781,188	20,123	24,005	61.5	1,553,483	726,225	329	101	23.5	39
	1925	2,381	706,884	745,700	11,312	22,252	61.5	1,426,395	658,691	350	77	18.0	63
Elgin, Joliet & Eastern	1926	460	130,015	137,271	5,112	3,917	65.2	296,169	158,163	79	14	14.8	3
	1925	460	118,448	122,721	3,956	3,555	65.0	266,679	141,394	72	19	21.2	2
Long Island	1926	393	44,851	48,808	12,435	567	54.1	37,913	14,783	44	10	19.2	...
	1925	393	48,205	53,561	13,530	629	57.5	40,014	15,588	43	12	21.7	...
Pennsylvania System	1926	10,883	4,876,462	5,302,574	391,930	145,646	64.5	9,467,585	4,467,178	2,669	542	16.9	384
	1925	10,877	4,644,708	5,008,513	367,366	133,932	64.0	8,775,300	4,149,858	2,597	735	22.1	292
Reading	1926	1,129	613,622	668,703	62,504	16,537	61.0	1,069,158	507,256	366	66	15.4	82
	1925	1,132	632,130	693,231	67,607	16,649	61.1	1,148,950	588,748	395	76	16.1	106
Pocahontas Region:												
Chesapeake & Ohio	1926	2,650	1,262,874	1,332,045	42,593	42,264	57.5	3,460,852	1,903,341	549	100	15.4	45
	1925	2,627	1,181,643	1,239,458	42,567	37,292	57.0	2,953,493	1,622,452	473	98	17.1	11
Norfolk & Western	1926	2,231	973,809	1,185,602	53,770	34,674	58.6	2,859,443	1,570,641	589	50	7.8	139
	1925	2,231	837,786	1,016,545	29,639	27,694	59.4	2,259,935	1,224,050	598	67	10.1	161
Southern Region:												
Atlantic Coast Line	1926	4,931	846,676	858,303	14,094	21,295	59.7	1,236,581	476,435	441	49	10.0	82
	1925	4,892	761,180	775,071	12,292	18,572	61.4	1,067,442	424,252	364	65	15.0	42
Central of Georgia	1926	1,907	461,004	469,669	9,510	9,755	65.5	559,996	229,190	158	15	8.4	4
	1925	1,907	416,391	418,243	6,931	8,302	68.5	457,661	195,366	161	9	5.5	20
I. C. (inc. Y. & M. V.)	1926	6,555	1,889,877	1,909,128	42,235	52,481	63.3	3,304,135	1,396,435	756	104	12.1	14
	1925	6,555	1,899,847	1,914,588	37,786	52,066	62.4	3,282,570	1,387,742	784	112	12.5	44
Louisville & Nashville	1926	5,021	1,857,835	1,940,381	62,418	39,109	61.5	2,504,595	1,251,860	594	114	16.1	16
	1925	5,027	1,787,994	1,883,076	63,961	35,656	61.0	2,376,185	1,141,572	627	93	12.9	31
Seaboard Air Line	1926	3,904	561,368	570,990	7,007	14,122	61.3	816,626	320,719	268	26	9.0	31
	1925	3,755	544,769	559,098	5,855	13,482	62.8	759,581	300,216	221	30	11.9	2
Southern Railway System	1926	8,050	2,215,856	2,249,013	38,496	53,740	63.4	3,022,688	1,195,920	1,076	157	12.8	58
	1925	8,157	2,076,100	2,118,858	41,513	50,318	66.4	2,744,077	1,107,192	1,075	137	11.3	89
Northwestern Region:												
Chic. & North Western	1926	8,457	1,505,683	1,548,742	24,554	37,654	61.6	2,260,940	979,983	743	156	17.4	114
	1925	8,469	1,387,106	1,422,816	24,879	33,307	61.3	1,969,487	831,862	728	219	23.1	135
Chic., Milw. & St. P.	1926	11,189	1,557,802	1,651,247	92,730	45,434	64.8	2,562,949	1,075,046	870	171	16.5	219
	1925	11,202	1,547,532	1,635,285	83,911	45,234	65.2	2,559,371	1,106,402	924	172	15.7	164
Chic., St. P., Minn. & Om.	1926	1,819	321,337	348,831	12,889	6,452	67.4	347,625	140,416	178	36	16.8	2
	1925	1,819	299,806	319,584	13,946	6,074	69.0	320,300	129,956	161	39	19.6	8
Great Northern	1926	8,165	773,645	799,091	46,363	29,308	63.2	1,804,860	863,327	556	153	21.6	123
	1925	8,253	799,240	824,486	40,571	28,220	64.0	1,706,885	820,001	565	174	23.5	99
M., St. P. & S. Ste. M.	1926	4,372	520,160	532,216	3,753	13,343	69.4	700,790	315,738	298	42	12.4	22
	1925	4,372	518,238	528,484	4,513	13,269	68.9	680,254	296,896	295	47	13.8	30
Northern Pacific	1926	6,510	812,767	857,131	48,020	26,047	66.9	1,456,367	615,179	497	147	22.8	74
	1925	6,520	800,408	838,284	47,582	24,246	68.0	1,352,578	575,029	515	171	24.9	101
Oreg.-Wash. R. R. & Nav.	1926	2,185	199,122	211,250	17,226	5,795	69.1	330,883	150,071	133	20	13.2	10
	1925	2,175	182,650	194,433	16,949	5,022	68.0	282,562	122,946	134	23	14.8	13
Central Western Region:												
Atch., Top. & St. Fe (incl. P. & S. F.)	1926	10,259	1,948,161	2,110,131	123,172	63,571	62.7	3,931,880	1,515,197	821	134	14.0	116
	1925	10,945	1,638,015	1,780,582	110,079	52,466	64.7	3,048,518	1,100,615	831	166	16.6	200
Chicago & Alton	1926	1,022	313,990	345,309	6,000	8,209	64.1	490,093	191,571	135	22	14.1	31
	1925	1,022	307,322	346,207	3,973	7,844	61.7	474,970	178,361	136	22	14.1	32
Chic., Burl. & Quincy	1926	9,349	1,448,901	1,501,186	55,236	43,635	63.9	2,546,634	1,153,377	812	180	18.1	98
	1925	9,338	1,412,183	1,465,776	62,182	41,460	64.4	2,424,105	1,110,808	821	180	18.0	94
Chic., Rock I. & Pacific	1926	7,864	1,514,681	1,602,587	21,505	38,261	65.0	2,230,175	958,166	558	143	20.5	40
	1925	7,861	1,425,425	1,526,017	19,582	34,673	68.7	1,867,808	776,505	563	144	20.3	32
Denver & R. G. Wn.	1926	2,575	230,852	276,873	49,580	6,606	71.8	374,022	175,736	242	40	14.1	39
	1925	2,577	213,243	256,867	47,384	5,922	71.8	337,996	161,460	257	44	14.5	76
Oregon Short Line	1926	2,537	274,997	293,959	23,966	7,942	64.9	469,664	202,982	190	25	11.6	51
	1925	2,414	282,331	295,542	19,285	7,539	64.1	447,714	194,811	190	28	12.7	57
Sou. Pac.—Pac. Lines	1926	8,534	1,643,325	1,809,482	294,852	49,838	62.7	3,044,785	1,108,875	770	165	17.6	58
	1925	8,517	1,532,344	1,675,091	284,035	44,594	64.0	2,675,836	1,049,939	755	173	18.6	74
Union Pacific	1926	3,691	1,007,477	1,032,247	47,558	37,890	61.0	2,257,020	770,098	457	61	11.7	130
	1925	3,688	901,752	918,966	53,313	32,403	59.4	1,941,515	655,407	468	76	14.0	201
Southwestern Region:												
Gulf, Colo. & S. Fe	1926	1,897	423,803	449,760	12,838	12,368	62.0	931,506	395,065	139	17	11.2	6
	1925	1,897	303,812	313,601	6,283	8,670	61.3	556,737	242,844	108	26	19.6	9
Mo.-Kans.-Tex.	1926	1,797	295,669	296,265	9,561	9,924	59.7	586,024	226,050	99	30	23.1	28
	1925	1,787	269,443	270,705	2,350	9,645	61.7	550,704	213,121	116	17	12.5	40
Mo.-Kans.-Tex. of Tex.	1926	1,389	237,606	251,556	6,017	6,505	60.7	409,414	180,450	110	33	23.1	35
	1925	1,389	189,042	198,824	3,519	5,043	60.5	303,071	122,320	133	14	9.8	66
Missouri Pacific	1926	7,288	1,333,176	1,376,356	39,791	38,432	66.5	2,238,348	995,092	543	86	13.7	4
	1925	7,278	1,386,361	1,431,047	41,608	37,289	64.8	2,189,600	960,503	558	96	14.7	17
St. Louis-San Francisco	1926	4,895	811,251	825,248	12,603	20,433	63.4	1,213,311	519,029	427	59	11.9	93
	1925	4,819	844,923	870,916	14,533	19,736	62.6	1,152,444	470,694	436	78	15.8	35
Southern Pacific Lines (in Tex. and La.)[1]	1926	4,469	660,636	662,049	2,549	14,566	66.8	833,443	351,105	264	66	20.0	50
	1925	4,427	666,040	667,548	5,198	14,930	64.7	864,863	361,731	260	69	21.0	35
Texas and Pacific	1926	1,953	305,618	305,618	682	8,291	63.8	431,438	179,640	135	25	13.8	39
	1925	1,953	314,893	314,893	5,114	7,696	66.2	436,062	175,329	144	41	22.1	15

[1]Includes Franklin & Abbeville, Galveston, Harrisburg & San Antonio, Houston & Shreveport, Houston & Texas Central, Houston East & West Texas, Iberia & Vermilion, Lake Charles & Northern, Louisiana Western, Morgan's La. & Tex. R. R. & S. S. Co., and Texas & New Orleans.

Compared with July, 1925, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotive and tender	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany....1926	2,515	5,180	7,695	5.1	14,781	1,152	446	20.1	433	32.0	8,193	167	63.8
1925	2,683	6,232	8,915	2.8	14,332	1,087	423	20.3	384	28.0	8,481	165	69.5
Boston & Maine....1926	13,785	13,693	27,478	7.4	14,594	1,357	556	20.7	304	21.1	3,903	126	48.0
1925	14,487	12,649	27,136	10.2	13,959	1,251	514	20.6	311	21.4	3,747	132	47.1
N. Y., New H. & Hartf..1926	18,574	20,010	38,584	15.9	17,206	1,441	577	20.6	245	17.6	5,003	111	54.8
1925	21,487	19,351	40,838	21.5	16,330	1,419	581	21.1	233	16.2	5,031	119	53.1
Great Lakes Region:													
Delaware & Hudson....1926	8,427	6,602	15,029	5.7	22,174	1,800	887	31.4	749	37.3	12,863	144	66.0
1925	8,845	6,702	15,547	9.0	20,977	1,735	877	32.7	726	34.2	12,889	159	66.8
Del., Lack. & Western...1926	16,012	8,153	24,165	4.6	21,805	1,814	812	25.5	614	35.2	14,838	126	76.7
1925	17,548	7,517	25,065	3.3	20,642	1,738	790	25.5	580	32.6	14,660	147	70.0
Erie (inc. Chic. & Erie)..1926	35,766	18,788	54,554	7.3	26,767	2,281	966	25.5	553	33.5	12,979	114	56.4
1925	38,692	19,170	57,862	7.8	25,775	2,279	1,010	26.6	519	29.7	12,911	114	49.7
Lehigh Valley 1926	21,600	8,922	30,522	5.9	25,014	1,889	865	27.5	542	30.4	12,304	139	48.9
1925	20,724	7,733	28,457	6.8	24,634	1,827	846	27.5	572	31.4	11,998	139	46.1
Michigan Central 1926	16,772	17,734	34,506	4.8	26,735	1,871	670	20.1	363	29.3	6,806	103	64.2
1925	17,537	17,175	34,712	4.4	26,882	1,869	668	19.3	344	29.0	6,541	103	53.7
New York Central.....1926	69,251	71,242	140,493	3.8	28,365	2,312	1,007	26.4	460	27.8	9,970	105	51.2
1925	76,656	66,425	143,081	4.2	26,973	2,239	983	26.7	427	25.3	9,430	110	48.0
New York, Chic. & St. L.1926	13,272	10,259	23,531	7.5	23,805	1,758	684	21.3	573	40.9	8,103	100	69.2
1925	14,250	10,422	24,672	5.6	22,651	1,713	664	21.3	537	38.7	7,936	104	67.2
Pere Marquette 1926	10,037	9,673	19,710	4.2	17,344	1,452	600	24.5	429	28.5	3,877	100	67.5
1925	11,378	8,053	19,431	5.0	15,030	1,346	584	24.8	373	23.8	3,294	107	62.2
Pitts. & Lake Erie.....1926	14,048	8,602	22,650	6.9	30,334	2,765	1,613	45.2	308	10.4	30,111	65	54.3
1925	15,810	6,337	22,147	5.9	28,447	2,627	1,525	44.6	265	9.2	25,338	65	43.3
Wabash 1926	14,745	10,193	24,938	3.2	26,438	1,725	713	22.7	659	42.4	6,583	110	63.7
1925	15,158	11,174	26,332	3.0	23,962	1,784	734	22.3	592	38.7	6,246	119	57.7
Central Eastern Region:													
Baltimore & Ohio.....1926	68,722	32,766	101,488	3.4	20,707	1,950	945	32.0	594	29.8	11,605	147	64.2
1925	73,864	35,242	109,106	8.1	20,108	1,895	924	31.3	506	25.3	10,627	147	59.3
Central of New Jersey...1926	19,343	11,123	30,466	5.3	19,840	1,986	969	31.7	268	14.3	11,810	142	36.7
1925	18,468	10,784	29,252	5.1	15,727	1,656	799	31.4	260	13.8	11,021	157	42.4
Chicago & Eastern Ill....1926	13,626	4,706	18,332	19.3	22,595	1,665	750	25.9	332	19.7	6,446	121	50.4
1925	15,272	4,170	19,442	16.4	21,634	1,616	730	26.0	278	16.6	5,711	128	44.8
Clev., Cin., Chic. & St. L.1926	18,884	20,946	39,830	6.2	27,118	2,094	979	30.3	588	31.6	9,868	108	60.2
1925	22,149	17,224	39,373	4.7	25,771	2,018	932	29.6	540	29.6	8,925	111	57.2
Elgin, Joliet & Eastern...1926	9,519	7,216	16,735	5.4	15,233	2,278	1,216	40.4	305	11.6	11,092	114	49.4
1925	10,151	6,759	16,910	7.9	16,972	2,251	1,194	39.8	270	10.5	9,920	112	44.9
Long Island 1926	2,070	6,203	8,273	0.8	4,771	845	330	26.1	58	4.1	1,213	270	36.4
1925	2,007	5,175	7,182	1.1	4,999	830	323	24.8	70	4.9	1,279	224	39.8
Pennsylvania System 1926	208,868	87,248	296,116	10.2	21,577	1,941	916	30.7	487	24.6	13,241	118	57.2
1925	216,451	82,832	299,283	11.6	20,824	1,889	893	31.0	447	22.5	12,308	121	52.1
Reading 1926	27,619	13,766	41,385	3.0	19,662	1,742	827	30.7	395	21.1	14,492	151	54.6
1925	26,278	14,119	40,397	2.4	20,641	1,818	931	35.4	470	21.8	16,783	152	52.2
Pocahontas Region:													
Chesapeake & Ohio.....1926	32,121	10,608	42,729	2.9	29,798	2,740	1,507	45.0	1,437	55.5	23,167	87	68.3
1925	30,597	10,905	41,502	4.3	25,634	2,499	1,373	43.5	1,261	50.9	19,921	97	72.5
Norfolk & Western.....1926	31,023	10,951	41,974	1.2	37,317	2,936	1,613	45.3	1,207	45.4	22,706	129	62.6
1925	31,183	8,181	39,364	4.2	33,933	2,698	1,461	44.2	1,003	38.2	17,695	137	50.7
Southern Region:													
Atlantic Coast Line.....1926	18,798	13,343	32,141	4.0	18,926	1,461	563	22.4	478	35.8	3,117	108	57.4
1925	19,370	11,271	30,641	4.3	18,228	1,402	557	22.8	447	31.8	2,797	112	59.2
Central of Georgia.....1926	5,098	8,705	13,803	5.3	15,594	1,215	497	23.5	536	34.8	3,877	149	89.3
1925	4,790	6,709	11,499	4.8	14,933	1,099	469	23.5	548	34.0	3,305	142	80.7
I. C. (inc. Y. & M. V.)..1926	40,917	24,940	65,857	4.6	22,893	1,748	739	26.6	684	40.6	6,872	119	73.1
1925	50,021	21,259	71,280	7.2	21,897	1,686	730	26.7	628	37.8	6,829	120	70.3
Louisville & Nashville...1926	45,353	18,515	63,868	11.8	16,916	1,402	674	32.0	632	32.1	8,042	139	91.3
1925	44,449	17,492	61,941	12.6	16,019	1,329	638	32.0	595	30.4	7,325	144	87.3
Seaboard Air Line.....1926	11,266	9,702	20,968	2.3	17,381	1,455	571	22.7	493	35.4	2,650	127	63.3
1925	11,548	8,458	20,006	3.6	16,193	1,394	551	22.3	484	34.6	2,579	131	72.5
Southern Railway System.1926	51,870	26,707	78,577	5.4	18,188	1,364	540	22.3	491	34.8	4,792	146	59.8
1925	54,674	26,069	81,343	7.2	17,838	1,322	533	22.0	439	30.1	4,379	144	57.5
Northwestern Region:													
Chic. & North Western...1926	50,186	26,931	77,117	7.5	18,865	1,502	651	26.0	419	25.6	3,738	122	56.5
1925	53,349	24,362	77,711	10.3	17,246	1,420	600	25.0	345	22.5	3,171	122	49.3
Chic., Milw. & St. P....1926	54,532	20,648	75,180	6.2	20,778	1,645	690	23.7	461	30.1	3,099	128	54.0
1925	55,499	21,172	76,671	8.4	20,014	1,654	715	24.5	466	29.2	3,186	130	50.6
Chic., St. P., Minn. & Om.1926	3,181	8,267	11,448	10.4	14,055	1,082	437	21.8	396	27.0	2,490	126	54.7
1925	3,479	7,280	10,759	10.6	13,708	1,068	433	21.3	390	26.4	2,305	138	53.6
Great Northern 1926	43,338	10,130	53,468	8.0	27,888	2,333	1,116	29.5	521	28.0	3,411	106	38.5
1925	46,822	8,776	55,598	8.6	24,866	2,136	1,026	29.1	476	25.6	3,205	112	37.8
M., St. P. & S. Ste. M..1926	19,447	6,336	25,783	6.3	15,937	1,347	607	23.7	395	24.0	2,330	100	50.9
1925	20,509	5,936	26,445	7.4	15,414	1,313	573	22.4	362	23.5	2,191	104	50.3
Northern Pacific 1926	37,381	8,057	45,438	7.4	23,385	1,792	757	23.6	437	27.6	3,048	129	45.3
1925	38,494	7,371	45,865	6.5	21,833	1,690	718	23.7	404	25.1	2,845	130	41.6
Oreg.-Wash. R. R. & Nav.1926	7,798	4,911	12,709	5.3	19,845	1,662	754	25.9	381	21.3	2,215	160	48.1
1925	6,645	4,492	11,137	5.4	18,897	1,547	673	24.5	356	21.4	1,824	169	43.3
Central Western Region:													
Atch., Top. & St. Fe 1926	57,554	25,093	82,647	4.8	26,532	2,018	778	23.8	591	39.6	4,764	107	75.4
(incl. P. & S. F).....1925	61,653	16,112	77,165	6.8	25,340	1,861	672	21.0	460	33.9	3,535	114	61.2
Chicago & Alton.....1926	10,143	4,970	15,113	6.4	19,533	1,561	610	23.3	409	27.4	6,047	137	72.1
1925	10,153	4,392	14,545	5.2	18,505	1,546	580	22.7	396	28.2	5,630	145	71.5
Chic., Burl. & Quincy...1926	50,034	18,667	68,701	5.7	22,826	1,758	796	26.4	542	32.1	3,980	123	50.6
1925	56,136	16,856	72,992	7.5	22,035	1,717	787	26.8	491	28.4	3,837	127	49.2
Chic., Rock I. & Pacific..1926	34,066	22,002	56,068	9.8	18,621	1,472	633	25.0	551	33.9	4,086	128	74.7
1925	36,758	20,435	57,193	10.7	16,759	1,310	545	22.4	438	28.5	3,305	141	70.5
Denver & R. G. Wn.....1926	11,009	4,091	15,100	3.3	16,757	1,620	761	26.6	375	19.7	2,202	180	37.5
1925	12,241	4,120	16,361	5.6	16,328	1,585	757	27.3	318	16.3	2,021	190	32.7
Oregon Short Line.....1926	7,033	3,899	10,932	5.2	22,981	1,708	738	25.6	599	36.1	2,581	116	47.8
1925	8,547	4,269	12,816	6.9	21,621	1,586	690	25.8	490	29.6	2,571	122	46.8
Sou. Pac.—Pac. Lines...1926	32,730	34,124	66,854	5.5	21,946	1,883	675	22.2	535	38.3	4,191	121	72.6
1925	31,605	32,755	64,360	5.4	19,981	1,746	685	23.5	526	34.9	3,977	127	68.2
Union Pacific 1926	22,706	11,182	33,888	9.6	36,261	2,240	764	20.3	733	59.2	6,730	104	67.2
1925	20,725	10,761	31,486	10.7	33,366	2,153	727	20.2	671	55.9	5,733	109	57.6
Southwestern Region:													
Gulf, Colo. & S. Fe.....1926	10,632	6,496	17,128	3.0	24,978	1,962	932	31.9	744	37.7	6,718	97	95.7
1925	7,978	4,330	12,308	5.0	25,591	1,833	799	28.0	634	36.9	4,129	100	76.8
Mo.-Kans.-Tex. 1926	8,608	3,865	12,473	5.5	26,992	1,982	765	22.8	585	43.0	4,080	86	76.7
1925	8,361	4,227	12,588	4.8	26,703	2,044	791	22.1	546	40.0	3,847	91	66.3
Mo.-Kans.-Tex. of Tex..1926	311	10,285	10,596	8.8	22,487	1,723	759	27.7	549	32.6	4,190	94	58.1
1925	291	11,617	11,908	8.9	19,621	1,603	647	24.3	331	22.6	2,840	102	44.3
Missouri Pacific 1926	28,509	23,211	51,720	6.0	21,115	1,679	746	25.9	621	36.1	4,404	118	72.7
1925	31,965	19,045	51,010	8.9	18,885	1,579	693	25.8	607	36.4	4,257	123	72.6
St. Louis-San Francisco..1926	20,183	12,296	32,479	4.6	18,926	1,496	640	25.4	515	32.0	3,420	135	54.5
1925	21,074	11,559	32,633	4.5	17,412	1,364	557	23.8	465	31.2	3,151	143	57.8
Southern Pacific Lines 1926	10,856	13,286	24,142	6.6	17,366	1,262	531	24.1	469	29.1	2,534	105	65.1
(in Tex. and La.)[1]....1925	10,890	14,687	25,577	8.3	17,862	1,299	543	24.2	456	29.1	2,636	112	65.8
Texas and Pacific 1926	5,876	5,868	11,744	4.2	21,974	1,575	588	21.7	493	35.7	2,966	100	55.0
1925	6,663	5,717	12,380	7.4	18,001	1,385	557	22.8	457	30.3	2,896	114	55.7

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

General News Department

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low subject to overflow where water is high, and if the storm damage was such as has been depicted this service would be impossible of establishment as early as this, and is a refutation of statements that have been made in respect to this matter.

"I simply cite this as a striking illustration of fact. The next illustration is the Seaboard railroad construction not completed between Miami and West Palm Beach and from Fort Ogden to Fort Myers and below, which covers both coasts, which construction, temporary or permanent as far as it goes, has not sustained any serious damage. There will be delays of perhaps a couple of weeks, partly because of the damage to contractor's equipment, temporary wooden structures where the contractor's men have been housed, and similar cases causing the contractors delay. Of course, this class of structure went down, as did the class of structures similar to the hundreds of automobile camps composed of crib and canvas construction and the innumerable little booths that line the various roads of Florida.

"The terminal of the C. H. & N. R. R. at Boca Grande, the line the Seaboard leased from the American Agricultural Chemical Company, has been somewhat damaged, covered by insurance."

A.R.S.M. Elects Officers at Chicago

The Association of Railway Supply Men, at a meeting held during the last day of the convention of the International Railway General Foremen's Association, Hotel Sherman, Chicago, elected the following officers to serve for the coming year: President, S. A. Witt, Detroit Lubricator Company, Chicago; secretary-treasurer, C. O. Jenista, Barco Manufacturing Company, Chicago. Following is a list of companies which exhibited at the General Foremen's Convention together with the products exhibited and the representatives in attendance:

Air Reduction Sales Company, New York—Airco products: Oxygen, nitrogen, argon, neon, calorene, acetylene; Arco Davis-Bournonville welding and cutting apparatus; Airco National carbide. Represented by E. M. Lexton, B. N. Law, H. L. Rogers, T. M. Hamer, G. E. Phelps, G. M. Smith, and R. T. Peabody.

American Brake Shoe & Foundry Company, New York—Brake shoes. Represented by H. W. Hearst, J. W. Waters and C. F. Weil.

American Locomotive Company, New York—Three-cylinder model; Alco cast steel engine truck; Alco power reverse gear; Flextite Steam pipe casing; Economy grease cellars; hand rail column; pipe clamp. Represented by Geo. G. Jones, Arthur Haller, Robert Brown and W. S. Morris.

Armstrong-Blum Manufacturing Company, Chicago—Marvel metal band sawing machine; automatic high-speed saw; high-speed edge hack saw blades. Represented by Harry J. Blum.

Ashton Valve Company, Boston, Mass.—Safety valves; back pressure steam and air gages; locomotive driving wheel quartering gage; dead weight pressure tester; wheel press recording gage and double ram attachment. Represented by C. Gaston and J. F. Gettrust.

Atkins, E. C., & Co., Indianapolis, Ind.—Kwik Kut hack saw machine; Silver steel hand and power hack saw blades; Cantol belt wax; Silver steel hand saws. Represented by George N. Haug and Claud E. Drake.

Barco Manufacturing Company, Chicago—Power reverse gears; metallic car steam heat connection; metallic steam, air water, and oil connections between engine and tender; flexible joints for locomotive piping, roundhouses, coach yards, shops and stations; automatic smokebox blower fitting; lubricated and balanced plug valves for all services. Represented by C. L. Mellor, C. O. Jenista and J. L. McLean.

Borden Company, Warren, Ohio—Beaver power drive and Beaver easy working pipe die stocks and Beaver square end pipe cutters. Represented by V. M. Gaspar.

Bradford Corporation, Chicago—Chambers locomotive front end throttle valve. Represented by E. J. Barnett.

Brewster, Morris B., Inc., Chicago—Metallic packing; James driving box; hose couplings; washout plugs; motor mica for hot bearings. Represented by John Ash and Morris B. Brewster.

Buckeye Portable Tool Company, Dayton, Ohio—Rotor type pneumatic drills and grinders. Represented by Wm. Gummere and H. W. Leighton.

Buffalo Brake Beam Company, New York—Brake beam auxiliary supports; self-locking connection pins; self-locking brake shoe keys; self-locking draft key locks. Represented by E. F. Gladwell.

Chicago Pneumatic Tool Company, Chicago—Air hammers; air drills; repair tools for drills and hammers. Represented by Geo. G. Porter; L. F. Duffy; F. O. Duffy; H. R. Deubel and J. L. Rowe.

Clark Manufacturing Company, Philadelphia, Pa.—Smith multiplex pressure devices (the Smith piston parter). Represented by W. B. Clark and H. J. Smith.

Cleveland Pneumatic Tool Company, Cleveland, Ohio—Pneumatic drills, riveting and chipping hammers; grinders; valve grinders; valves and hose fittings; hose couplings. Represented by H. S. Covey, C. J. Albert and B. H. Tripp.

Cleveland Engineering Company, Cleveland, Ohio—Circular relief tool grinder. Represented by C. W. Mader.

Cleveland Twist Drill Company, Cleveland, Ohio—Twist drill reamers. Represented by A. J. Ireland, H. S. White, W. L. Evans, O. H. Hanson and I. P. Farnum.

Colonial Steel Company, Chicago—Literature. Represented by W. E. Thurber.

Crucible Steel Company of America, Pittsburgh, Pa.—Tool steels and tools. Represented by P. J. Connor, F. Baskerfield, Wm. Stevenson and G. H. Jones.

Davis Boring Tool Company, St. Louis, Mo.—Car wheel boring tools; expansion boring tools and expanding block type tools for turret lathes, boring mills, etc.; expansion reamers; cutter grinding machines and fixtures. Represented by William Morgan and Richard Monahan.

Dearborn Chemical Company, Chicago—Literature. Represented by L. P. Bowen, H. Rehmeyer, C. M. Hoffman, N. P. Dunn, and J. D. Purcell.

Detroit Lubricator Company, Chicago—Model "A" mechanical lubricator; thermo static heater for mechanical lubricator; improved diaphragm check valve for mechanical lubricator; flange oiler; hydrostatic lubricators; transfer filler. Represented by S. A. Witt and C. L. Butler.

Dickinson, Paul, Inc., Chicago—Car jacks; Aeolus ventilators; exhaust heads. Represented by A. E. Engman and C. Wm. Hansen.

Duff Manufacturing Company, Pittsburgh, Pa.—Car and locomotive lifting jacks; bushing pullers. Represented by C. N. Thurlin and E. E. Thurlin.

Edna Brass Manufacturing Company, Cincinnati, Ohio—Water columns; mechanical lubricators; non-lifting injectors; rigid water glass connections; oil burners for locomotives; feedwater pump boiler check. Represented by E. O. Corey, Wm. Beck, H. A. Glenn and F. S. Wilcoxen.

Faessler, J., Manufacturing Company, Moberly, Mo.—Rod bushing rollers. Represented by G. R. Maupin.

Firth-Sterling Steel Company, Chicago—Literature on blue chip high-speed steel; special tool and die steel, and stainless steel. Represented by C. O. Ericke, C. E. Hughes and E. T. Jackman.

Forster Paint & Manufacturing Company, Winona, Minn.—Represented by H. J. Caswell.

Gairing Tool Company, Detroit, Mich.—Counterbores, spot facers and core drills. Represented by G. J. Landry, C. B. Cole and H. D. Strelluf.

Goddard & Goddard, Detroit, Mich.—Milling cutters. Represented by C. S. Goddard, C. H. Wallace and H. S. Huncke.

Graham-White Sander Corporation, Roanoke, Va.—Sanders and locomotives sand spreaders; automatic sander for boosters and auxiliary locomotives. Represented by W. L. Ranson and W. H. White.

Hauck Manufacturing Company, Brooklyn, N. Y.—Venturi low-pressure burners; safety suction torches; midget rivet forge; kerosene hand torch. Represented by W. C. Squire and J. Escheman.

Hubbard Steel Foundry Company, East Chicago, Ind.—Crosshead. Represented by R. B. Hill and G. H. Lillie.

Hulson Grate Company, Inc., Keokuk, Iowa—Model of Hulson locomotive grates. Represented by A. W. Hulson, O. L. Yocum and J. W. Hulson.

Hunt-Spiller Manufacturing Company, Boston, Mass.—Cylinder packing; Duplex packing; crosshead shoes; floating bushings; valve bushings; valve rings; brake drums for auto buses. Represented by V. W. Ellet, E. G. Fuller and C. L. Galloway.

Huron Manufacturing Company, Detroit, Mich.—Washout and arch tube plugs. Represented by H. N. Reynolds and E. H. Willard.

Ingersoll-Rand Company, New York.—Pneumatic drills, grinders, chipping hammers; riveting hammers. Represented by F. M. Cross, G. C. Kehrer and T. E. Forbes.

Jenkins Bros., New York—Valves and packing. Represented by George Royal.

Johns-Manville, Inc., New York—Insulation; asbestos packings; high temperature cement. Represented by P. C. Jacobs; F. C. Vandervoort, Jr., D. M. Lewis and L. S. Wilbur.

Jones & Lamson Machine Company, Springfield, Vt.—Hartness flat turret lathe radial staybolt turning and threading attachment; automatic dies; Hartness thread compensator taps. Represented by J. C. Price, G. S. McClellan and C. F. Childs.

Lehon Company, Chicago—Roofing materials; water proofing products; cements. Represented by G. E. Eipper and H. Wolf.

Locomotive Firebox Company, Chicago—Literature on thermic syphons. Represented by C. S. Seley and John Baker.

Locomotive Stoker Company, Pittsburgh, Pa.—Model of D1 Duplex stoker. Represented by E. F. Milbank, V. B. Emrich, J. B. Ball and E. Ryan.

Madison-Kipp Corporation, Madison, Wis.—Force feed locomotive lubricator. Represented by A. H. Flanagan and Frank R. Clark.

Manning, Maxwell & Moore, Inc., New York—Exhibiting Sheldon knuckle joint boring tool; Sheldon superheater unit grinder; Sheldon locomotive frame jaw grinder; Sheldon piston drilling and milling machine; Sheldon crank pin milling machine; Sheldon general purpose pneumatic grinder; Sheldon washout plug cleaner; Hancock inspirators; Ashcroft gages; Consolidated safety valves. Represented by R. S. Dean, C. L. Brown, C. W. Corning, A. J. Cote, W. A. Deems, E. D. Garfield, R. D. Gaumond, F. C. Schreiber, H. S. Smith, P. P. Wagener, and J. P. Groome.

McLean Fogg Lock Nut Company, Chicago—Lock nuts. Represented by J. W. Fogg and J. A. MacLean.

Metal & Thermit Corporation, New York—Literature on Thermit welding. Represented by H. D. Kelley and W. H. Moore.

Midwest Valve Corporation, Toledo, Ohio—Piston type valves. Represented by D. R. Murphy and H. G. Gilg.

Milburn, Alexander, Company, Baltimore, Md.—Portable carbide lights; oxyacetylene welding and cutting apparatus. Represented by G. B. Malone.

Miner, W. H., Inc., Chicago—Friction draft gears; friction buffers; roller side bearings and bolster center locking pins. Represented by B. S. Johnson.

Nathan Manufacturing Company, New York—Injectors and lubricators. Represented by R. Welsh.

National Malleable & Steel Castings Company, Cleveland, Ohio—Couplers; journal boxes; draft gears; yokes; miscellaneous malleable castings. Represented by L. S. Wright, G. R. Rasmussen and F. E. Moffett.

Ohio Injector Company, Chicago—Chicago T non-lifting injector; Chicago R non-lifting injector; Ohio fire jet; Ohio low water alarm; drifting valve; flange oiler; lubricator; boiler. Represented by A. C. Beckwith, F. W. Farnsworth and W. H. Malone.

Okadee Company, Chicago—Locomotive front end hinge; blow-off valve; water glass protector; automatic cylinder cock; tender hose coupler. Represented by A. G. Hollingshead, J. S. Lemley, G. P. Dirth, G. S. Turner, F. J. Kearney, W. H. Heckman and C. W. Ploen.

O'Malley-Beare Valve Corporation, Chicago—Globe valves; angle valves; blow-off valves; gage cocks; Perfection valves. Represented by Bruce P. Owens, F. E. Brown, F. E. McCarthy, R. Lugger and C. F. Piggott.

Oxweld Railroad Service Company, Chicago—Carbide lamps; welding and cutting apparatus. Represented by G. M. Crownover, A. V. Lucas, M. A. Deaton, W. Williams, C. S. Wright, F. H. Frye, J. J. Saelens and S. H. Moore.

Pilliod Company, New York—Baker valve gear. Represented by J. H. Cooper, W. H. Bellmaine and Frank Fisher.

Pilot Packing Company, Chicago—Drifting valves; packing. Represented by R. M. Sinkler.

Pratt & Whitney Division of Niles-Bement-Pond Company, Chicago—New improved channeling and slabbing cutters; A. R. A. gages; staybolt taps; lateral gages; Model B lathe. Represented by E. E. Cullison, J. L. Woods, F. A. Armstrong and W. R. Mullinix.

Pyle National Company, Chicago—Full line of train lighting, train control, and headlighting equipment; safety switches. Represented by R. L. Kilker, Wm. Miller, J. A. Amos and W. Ross.

Railway Age, New York.—Represented by R. F. Duysters, H. C. Wilcox, H. H. Morrison, J. M. Rutherford and E. L. Woodward.

Railway Mechanical Engineer, New York—Represented by R. F. Duysters, H. C. Wilcox, H. H. Morrison, J. M. Rutherford and E. L. Woodward.

Railway Purchases & Stores, Chicago—Represented by K. F. Sheeran, Edw. Wray and H. B. Kirkland

Railway Review, Chicago—Represented by J. A. Walsh.

Reliance Machine & Stamping Works, Inc., New Orleans, La.—Speed-high pressure grease gun and filler necks for connecting rod lubrication. Represented by E. B. Norman and Carl Sutter.

Ridge Tool Company, Elyria, Ohio—Ridgid pipe wrenches; vise stands; post vises; bench vises; pipe cutters. Represented by J. E. Lawrence and R. Kuepper.

Smith Welding Equipment Corporation—Acetylene welding and cutting equipment and generators. Represented by Wm. F. Johnson.

Snap-On Wrench Company, Milwaukee, Wis.—Interchangeable socket wrenches for industrial use. Represented by C. H. Tennyson and Rogers Palmer.

Standard Oil Company of Indiana, Chicago—E. F. Fegtmeyer, C. J. Henry, E. C. Haskin, E. G. Lowe, W. O. Scharr and R. J. Ronan.

Standard Stoker Company, Inc., New York—Working model of du Pont-Simplex Type B stoker. Represented by Robt. Schlacks, C. T. Hansen, M. F. Robertson and Henry S. Mann.

Sunbeam Electric Manufacturing Company, Evansville, Inc.—Cross-section 2-pole train control generator; 4-pole train control generator. Represented by C. E. Kinnaw and M. C. Peterson.

Torchweld Equipment Company, Chicago—Welding and cutting apparatus. Represented by W. A. Stark, J. L. Jensen and R. C. Guteke.

Transportation Devices Corporation, Indianapolis, Ind.—Mechanical control of locomotive cut-off; locomotive cut-off indicator; internal quick action bell ringer; superheater unit grinder. Represented by E. C. Karibo and F. H. Lietz.

Union Manufacturing Company, New Britain, Conn.—Chucks for railway shops and production work. Represented by E. I. Stevens.

Viloco Railway Equipment Company, Chicago—Viloco sanders; bell ringer; rail washer; Crescent piston rod and valve stem packing; vacuum bell ringer; grease lubricator for piston rods. Represented by G. S. Turner, G. P. Dirth, J. S. Lemley, F. J. Kearney, W. H. Heckman and C. W. Ploen.

Westinghouse Air Brake Company, Wilmerding, Pa.—M-3 and M-3-A feed valves; Type B automatic air cylinder oil cup; improved centrifugal dirt collector; leakage indicator for 3T test rack; steel valve cages for cross-compound compressors; Wabco packing cups and gaskets.

Traveling Engineers' Exhibit

In addition to an unusually fine program and list of speakers, one of the notable features of the Traveling Engineers' convention, held at Chicago September 14 to 17, inclusive, was the well-balanced and comprehensive exhibition by 113 railway equipment and supply companies. A number of speakers, including Commissioner Frank McManamy of the Interstate Commerce Commission and John E. Muhlfeld, consulting engineer, New York, commented especially on the value of the exhibition in supplementing information obtained by the members of the association at their technical meetings.

Credit for the preparation of the exhibition is due the Railway Equipment Manufacturers' Association which, at its annual meeting held in the Rose Room of the Hotel Sherman, September 15, elected the following officers for 1927: President, J. Sinkler, Pilot Packing Company, Inc., Chicago, first vice-president; J. F. Gettrust, Ashton Valve Company, Chicago; second vice-president, J. J. Cizek, Leslie Company, Oak Park, Ill.; secretary-treasurer, Fred Venton, Crane Company, Chicago. The members of the executive committee are C. F. Weil, American Brake Shoe & Foundry Company, Chicago; E. J. Fuller, Hunt-Spiller Manufacturing Corporation, Boston, Mass.; and A. J. Poole, Galena-Signal Oil Company, Chicago.

The following data concerning the exhibits shows the name of each company, location of its main office, products exhibited and representatives in attendance:

American Arch Company, Inc., New York—Sectional arch. Represented by R. J. Himmelright, J. T. Anthony, T. Mahar, T. Ferguson, A. M. Sucese, W. W. Neal, E. T. Cook, A. Becker, George Wagstaff, W. W. Haig, E. T. Mulcahy and A. W. Clokey.

American Brake Shoe & Foundry Company, New York—Steel back car wheel and driving brake shoes; expanded metal inserts. Represented by Fred P. Biggs and C. F. Weil.

American Locomotive Company, New York—Model of three-cylinder locomotive; cast steel engine truck; Becker wrist pin; Type G power reverse gear; steam pipe casing; driving box cellar; hand rail columns. Represented by J. B. Ennis, George G. Jones, W. S. Morris, Robert Brown and Arthur Haller.

American Railway Appliances Company, Inc., New York—Flue blower. Represented by L. D. Brown and J. W. Henry.

American Steel Foundries, Chicago—Model of Dalman truck; cast steel wheels; vertical key coupler yoke; brake beams; clasp brakes; literature. Represented by W. C. Walsh and W. G. Wallace.

Ar-an-Ess Manufacturing Company, Chicago—Air-operated locomotive firedoor; journal bearing boring machine. Represented by E. H. Bauer.

Armand Railway Equipment Corporation, New York—Automatic locomotive bell control; engine truck cellars; grease and oil cups. Represented by A. Lymburner, J. P. O'Reilly, W. P. Kearney, A. J. Lymburner and J. Driscoll.

Ashton Valve Company, The, Boston, Mass.—Safety valves; back pressure steam and air gages; whistles; testers. Represented by H. O. Fettinger, Charles Gaston and J. F. Gettrust.

Badeker Manufacturing Company, Chicago—Piston rod packing; hub liner. Represented by J. P. McKinley and E. V. Lea.

Baldwin Locomotive Works, The, Philadelphia, Pa.—Photographs. Represented by Charles Riddell, C. H. Gaskill and W. H. Evans.

Ball Railroad Time Service, The, Chicago—Time service and watch inspection. Represented by S. Y. Ball, L. L. Doty, J. H. Barkemeyer, C. W. Brechner, F. A. Tinkler and J. W. Dodge, Sr.

B & S Manufacturing Company, The, Hoboken, N. J.—Locomotive drifting valve. Represented by John Weikley and Charles Stern.

Barco Manufacturing Company, Chicago—Power reverse gear; flexible metallic connection between locomotive and tender, rear of tenders and between cars; flexible joints for locomotive pipe connection to reservoirs and auxiliary devices; balanced and lubricated plug valves; automatic smoke box blower fitting. Represented by F. N. Bard, C. L. Mellor, F. H. Stiles, A. S. Lewis, W. J. Behlke, C. O. Jenista, F. B. Nugent, L. E. Livingston, J. E. McLean and M. H. Weston.

Bassick Manufacturing Company, The, Chicago—Alemite locomotive lubricating equipment for main and side rods, valve gear, shoes and wedges; hub plates. Represented by John H. Karow and Robert Shays.

Bethlehem Steel Company, Bethlehem, Pa.—Auxiliary locomotive. Represented by I. C. Jordan, J. A. Stuart and F. M. Morley.

Bird-Archer Company, The, New York—Anti-scaling, anti-pitting and anti-foaming compounds. Represented by L. F. Wilson, P. Bowman Bird, J. A McFarland, W. E. Ridenour, C. J. McGurn, T. A. Peacock, George E. Chollar, J. J. Clifford, J. L. Callahan, R. A. Wilsey and Catherine Alten.

Bradford Corporation, The, New York—Front end type throttle; Chambers back head type throttle; Bradford rocker type draft gear. Represented by E. J. Barnett, A. C. Bodeau, B. C. Wilkerson and J. C. Keene.

Brewster, Inc., Morris B., Chicago—Piston rod packing; air pump packing; pipe couplings; removable and adjustable driving box brass; wash out plug. Represented by Morris B. Brewster, C. A. Kotche and John Ash.

Buffalo Brake Beam Company, New York—Brake beam auxiliary supports, self locking connection pines, self locking draft key locks, safety brake shoe keys. Represented by E. F. Gladwell and C. R. Busch.

Buckeye Steel Castings Company, The, Columbus, Ohio—Cast steel coupler yoke; literature. Represented by H. W. Hurst and F. A. Martin.

Byers Company, A. M., Pittsburgh, Pa.—Wrought iron pipe; literature on the proper grinding of pipe threading tools. Represented by J. H. Ainsworth and F. W. Stubbs.

Chicago Pneumatic Tool Company, Chicago—Speed recorder; riveters, drills, hoists, chippers, rivet buster and compressor. Represented by F. R. Liggett, F. O. Duffy, J. L. Rowe and H. R. Deubel.

Clark Manufacturing Company, Philadelphia, Pa.—Multiplex pressure jacks. Represented by H. J. Smith.

Coffin, Jr. Company, The J. S., Jersey City, N. J.—Feedwater heater system; C-S truck. Represented by J. S. Coffin, Jr., and E. L. Schellens.

Crane Company, Chicago—Railway fittings and valves; cast steel valves; power plant material. Represented by F. W. Venton, J. C. Cole and H. Bartlett.

Crane-Hanson Company, Excelsior, Minn.—Positive water circulator for steam generating boilers. Represented by Clifford M. Crane.

Dearborn Chemical Company, Chicago.—Literature on water treatment, rust preventative and lubricating oils. Represented by O. H. Rehmeyer, William Gemlo, Nelson F. Dunn, Isaac H. Bowen, William Kinney, Harry P. Ross, Charles M. Hoffman, F. J. Boatright, F. B. Horstmann, A. W. Cooley, J. W. Nutting, J. F. Roddy and J. D. Purcell.

Detroit Lubrication Company, Detroit, Mich.—Hydrostatic lubricator; 3 and 8-pipe transfer filler; automatic flange oiler; mechanical lubricator; diaphragm check valve. Represented by A. G. Machesney, S. A. Witt and G. L. Butler.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Lifting jacks; high speed self-lowering governor controlled ball-bearing journal jacks; rachet and geared rachet jacks. Represented by C. N. Thulin and E. E. Thulin.

Edna Brass Manufacturing Company, The, Cincinnati, Ohio—Water column; injectors; water glasses; mechanical lubricators; boiler checks. Represented by E. O. Corey, F. S. Wilcoxen, C. B. Randall and William Beck.

Ewald Iron Company, Louisville, Ky.—Represented by W. R. Walsh.

Electric Service Supplies Company, Philadelphia, Pa.—Locomotive headlights; Turbo-generators; locomotive light markers; headlight control switches. Flood lights. Represented by J. W. Porter, J. F. Carper, B. D. Barger and T. M. Childs.

Faessler Manufacturing Company, The J., Moberly, Mo.—Side and main rod bushing rollers. Represented by J. W. Faessler and G. R. Maupin.

Ford Company, The J. B., Wyandotte, Mich.—Industrial cleaning materials. Represented by B. N. Goodell and P. V. Ward.

Foster Engineering Company, Chicago.—Pressure reducing valve; flexible ball joint; automatic stop and check valve; sight flow water box; float valve and pump governor. Represented by C. A. Olson, A. L. Greenlaw and George H. Bauer.

Franklin Railway Supply Company, Inc., New York—Sectionalized power reverse gear; booster for the tender; sectionalized booster control equipment; model of limited cut-off; Flexible pipe joints; unit safety bar and radial buffer; lateral motion driving box. Represented by H. F. Ball, W. H. Coyle, H. M. Evans, J. L. Randolph, J. S. Coffin, J. W. Floyd Coffin, W. Lane, Paul Weiler, T. L. Reed, J. A. Tulty, Thomas Whelan, Paul Willis, Sam Rosenfelt, J. McLaughlin, F. M. Ball, J. L. Bacon, Harry Vincent, E. D. Caldwell, Frank Cunningham, William H. Holton and H. E. Seifried.

Galena-Signal Oil Company, Franklin, Pa.—Represented by W. J. Walsh, P. H. Stack, C. B. Royal, Charles McNair, A. J. Bell, L. A. Drukey, D. L. Eubanks, R. A. Greene, W. E. Ladley, F. C. Langdon, E. McVicar, L. H. Palmer, A. J. Poole, W. C. West, F. P. White, J. F. Wilsey and F. H. Wright.

Garlock Packing Company, The, Palmyra, N. Y.—Fibrous and metal packings; power reverse gear cups; power reverse gear piston rod packings. Represented by H. J. Ramshaw, R. J. Hinkle and W. G. Cook.

Garratt-Callahan Company, Chicago—Boiler preservative. Represented by A. H. Baker, A. H. Hawkinson, J. G. Barclay, W. P. Caspers and H. M. Gray.

Gilg, Henry F., Pittsburgh, Pa.—Murphy valve for washout and blowoff; Centrifix, separator for steam, air, gas, dust, water and oil. Represented by Henry F. Gilg.

Gill Railway Supply Company, Peoria, Ill.—Grisco driving boxes; cooling compound; journal lubricator. Represented by J. O. Gill, H. C. Gullette, E. H. Hartenstein, D. H. French and G. O. Hauskins.

Graham-White Sander Corporation, Roanoke, Va.—Locomotive sanders for steam and electric locomotives; automatic sander for boosters and

auxiliary locomotive; sand spreader for flat bottom sand boxes. Represented by W. L. Ranson, and W. H. White.

Gustin-Bacon Manufacturing Company, Philadelphia, Pa.—Literature. Represented by Fred Speer.

Hanna Stoker Company, The Cincinnati, Ohio—Locomotive stoker. Represented by Frank K. Tutt.

Hubbard Steel Foundry Company, East Chicago, Ind.—Crosshead with an outside applied wrist pin; samples of cast steel. Represented by J. T. Osler, R. B. Hill and G. W. Lillie.

Hulson Grate Company, Keokuk, Iowa—Locomotive grate. Represented by A. W. Hulson, O. L. Yocum and J. W. Hulson.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Crosshead shoes; cylinder bushings; cylinder valve packing; piston and valve bull rings; valve chamber bushings; floating rod bushings; bus and truck brake drums; hub liners. Represented by J. G. Platt, V. W. Ellet, E. J. Fuller, C. L. Galloway, F. B. Hartman, R. R. Wells, F. Lampton and Gordon Leach.

Huron Manufacturing Company, Detroit, Mich.—Washout and arch tube plugs. Represented by M. F. Willard, E. H. Willard and H. N. Reynolds.

Imperial Brass Manufacturing Company, The, Chicago—Lubricator filler; brass specialties; grease plug bushing. Represented by J. A. Kearney, P. Dorsey and D. W. Lewis.

International Correspondence School, Scranton, Pa.—Represented by A. C. Drynan, H. T. Pottenger, Joe Gambill and E. M. Sawyer.

International Trade Press, Chicago—Copies of Safety Engineering, International Railway Journal and American Machine Tool Record. Represented by F. H. Jones.

Jenkins Brothers, New York—Valves and packing; gage glasses. Represented by George Royal.

Johns-Manville, Inc., New York—Locomotive packings; pipe and boiler insulation; high temperature cements. Represented by J. C. Younglove, D. M. Lewis, P. C. Jacobs, F. C. Vandervort, Jr., P. R. Austin, L. C. Wilbur and R. L. Poulson.

Jones & Lamson Machine Company, Springfield, Vermont—4 in. by 34-in. flat turret lathe equipped for bar work; radial stay-bolt attachment; screw thread comparator; full line of automatic self-opening dies; ground taps. Represented by J. C. Price, H. V. Wiggins, G. S. McClellan, M. N. White and F. E. Childs.

Okadee Company, The, Chicago—Blow Off Valves; Tender hose coupler; Automatic cylinder cock; Locomotive front end hinge; Water glass protector. Represented by A. G. Hollingshead, G. S. Turner, J. S. Lemley, F. J. Kearney, W. H. Heckman, G. P. Dirth, Chas. R. Long, Jr., C. W. Ploen, and J. M. Monroe.

Leslie Company, Lyndhurst, N. J.—Represented by S. I. Leslie, Pres., J. J. Cizek, and C. W. Sullivan.

Lima Locomotive Works, Inc., New York—Running gear of model of 2-8-4 type steam locomotive. Represented by W. E. Woodard, W. H. Winterrowd, H. W. Snyder and M. K. Tate.

Locomotive Finished Material Company, The, Atchison, Kansas—Combination sectional bull ring and packing; sectional packing rings; Universal blow-off muffler. Represented by R. L. MacIntosh and C. Hastings.

Locomotive Firebox Company, Chicago—Thermic Syphon. Represented by W. S. Carr, G. N. DeGuire, A. A. Taylor, C. A. Seley, C. M. Rogers, B. E. Larson, John Baker, and A. M. Wheeler.

MacLean-Fogg Lock Nut Company, Chicago—Lock nuts. Represented by J. A. MacLean, J. W. Fogg and Clifford Beaumont.

Madison-Kipp Corporation, Madison, Wis.—Mechanical lubricator; springless check valve. Represented by A. H. Flanagan, A. J. Ahrensmeyer and F. R. Clark.

Manning, Maxwell & Moore, Inc., New York—Inspirators, boiler checks and other locomotive appliances; safety valves; pressure gages. Represented by C. L. Brown, J. H. Busch, C. W. Corning, Joseph Walsh, J. Soule Smith, W. H. Williston and Fred Wilson.

Miller Heating Company, F. W., Chicago—Represented by B. C. Rinehart.

Miner, Inc., W. H., Chicago—Friction draft gears for passenger and freight cars; roller side bearings; passenger car buffers; safety bolster center locking pins. Represented by B. S. Johnson.

Mudge & Co., Chicago—Unit spark arrester. Represented by F. H. DeBrun, A. R. Fletcher.

Nathan Manufacturing Company, New York—Mechanical lubricators; hydrostatic lubricators; water columns; low water alarm; lifting and non-lifting injectors; boiler checks. Represented by Richard Welsh, T. J. Murphy, F. Ehredt, R. Jenkins, F. C. Davern, D. Beatty, W. R. Walsh and F. Marsh.

National Boiler Washing Company, Chicago—Represented by T. G. Dalton.

National Malleable & Steel Castings Company, Cleveland, Ohio—Models of friction draft gears; type D coupler; Sharon coupler; A. R. A. coupler yokes; coil spring journal boxes; extended floor coupler pockets; wrecking hook; hose clamps and washers. Represented by G. R. Rasmussen, and E. A. Powell.

National Railway Devices Company, Chicago—Radial fire door (Original); radial fire door No. 2. Represented by J. G. Robinson and E. J. Gunnison.

National Safety Appliance Company, San Francisco, Cal.—Automatic train control. Represented by E. E. Johnson and J. C. Anderson.

National Tube Company, Pittsburgh, Pa.—Hot rolled seamless locomotive boiler tubes. Represented by P. J. Conrath and J. W. Kelly.

New York Air Brake Company, New York—Literature. Represented by E. F. Wentworth, H. T. Wentworth, O. W. Trieglauff, C. B. Miles, L. W. Sawyer, George Kliefges and F. A. Geister.

Norton, Inc., A. O., Chicago—Lifting jacks for car and locomotive work. Represented by R. J. McKay and E. W. Hanegan.

Nye Tool & Machine Works, Chicago—Pipe vises; thread cutting dies; pipe cutters; ratchet pipe reamer; die stocks; nipple wrench; ratchet handle. Represented by William Clement.

Ohio Injector Company, The, Chicago—Injector; low water alarm; boiler check valve; water glass protector; hose strainer; fire jet; non-lifting injector; lubricator; flange oiler; automatic drifting valve. Represented by F. W. Edwards, W. H. Malone, F. B. Farnsworth, C. G. Sauerberg, N. M. Barker, A. C. Beckwith.

O'Malley-Beare Valve Corporation, Chicago—Multiplate valves. Represented by B. P. Owens, J. E. Brown, F. E. McCarthy, R. F. Hugger and C. F. Pigott.

Oxweld Railroad Service Company, The, Chicago—Welding and cutting equipment; inspector's carbide lamp. Represented by William Jones, G. M. Crownover, H. W. Schulze, W. A. Hogan, A. N. Lucas and W. A. Champieux.

Paige & Jones Chemical Company, New York—Chemicals and wayside tank method of treating boiler waters. Represented by C. B. Flint, R. E. Falkinburg, H. A. Brinsley and C. R. Everett.

Paxton-Mitchell Company, Omaha, Nebr.—Piston rod, valve stem and air pump packing. Represented by J. J. Keliher and H. J. Molloy.

Pilliod Company, The, New York—Valve gear. Represented by J. H. Cooper, Frank Fisher and W. H. Bellmaine.

Pilot Packing Company, Chicago—Packing. Represented by R. Sinkler and J. Sinkler.

Piston Ring Company, The, Muskegon, Mich.—Piston and packing rings, individually cast, one piece for steam cylinders and valves and all auxiliary locomotive equipment. Represented by E. W. Cadman and R. R. Beardsley.

Pyle National Company, Chicago—Turbo-generators for locomotive lighting, train lighting, and train control; classification and marker lamp; safety switches and conduit wiring accessories; cast aluminum and sheet metal headlight case; tender lamps; floodlights in various sizes. Represented by J. Will Johnson, William Miller, J. A. Amos, W. A. Ross, W. T. Bretherton, J. V. Baker and R. L. Kilker.

Quick Filling Grease Cup Company, Terre Haute, Ind.—Grease Cups. Represented by M. Henry and A. C. Byrd.

Railway Journal, Chicago—Copies of publication. Represented by J. A. Williams.

Railway Purchases & Stores, Chicago—Copies of Publications. Represented by Edward Wray and K. F. Sheeran.

Railway Review, Chicago—Copies of Publication. Represented by A. D. McIntyre and H. G. Miller.

Reliance Machine & Stamping Works, Inc., New Orleans, La.—High pressure greaser appliances. Represented by E. B. Norman and Carl Sutter.

Ridge Tool Company, The, Elyria, Ohio—Pipe wrenches; pipe cutters; vise stands; post vises; bench vises. Represented by J. E. Lawrence and R. Kuepper.

Sargent Company, Chicago—Blower valve; 3-face gage; gage cocks; water glass gaskets; water columns; iron clad protector. Represented by L. L. Schultz.

Wm. Sellers & Co., Inc., Philadelphia, Pa.—Exhaust feed water heater injector; 1922 lifting and non-lifting injectors; boiler tester; boiler checks; cold water squirt; drifting valve; tank hose strainer. Represented by J. D. McClintock and P. E. Raymond.

Sheafe Engineering Company, Chicago—Air hose couplings; air hose nipples; air hose clamps; air pump cages; air pump valves; stuffing box nuts and glands; gages for air hose coupling. Represented by Ralph Sheafe.

Simmons-Boardman Publishing Company, New York—Copies of *Railway Age* and Railway Mechanical Engineer. Represented by R. F. Duysters, J. M. Rutherford, H. A. Morrison, E. L. Woodward and C. B. Peck.

Snap-On Wrench Company, Chicago—Interchangeable socket wrenches. Represented by C. H. Tennyson.

Standard Oil Company, (Indiana)—Literature. Represented by E. F. Tegtmeyer, E. G. Lowe, G. F. Kemme, C. J. Henry, R. G. Ronan, W. O. Schorr, F. G. Bowman and B. J. Anderson.

Standard Oil Company of Louisiana, New Orleans, La.—Railroad valve oil; car and engine oil; driving journal compound (in cakes); rod cup grease (in sticks); electric car grease; external gear grease. Represented by M. T. Wooley and H. C. Ferrell.

Standard Oil Company of New Jersey, New York.—Represented by W. F. Walsh and G. W. Tullis.

Standard Stoker Company, Inc., New York—A working model of Type "B" stoker as applied to large locomotives; literature and descriptive matter relating to the application and operation of the type "B" stoker. Represented by F. P. Roesch, Robert Schlacks, Guy Myers, C. T. Hansen, L. Sweeney, Herman Zahn and H. S. Mann.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—RE 3 turbo-generator cross section; 4-pole turbo-generator; rust proof steel headlight; airtight headlight. Represented by J. H. Schroeder, M. C. Peterson and C. Kinnaw.

Superheater Company, The, New York—Exhaust steam injector; feed water heater and multiple valve locomotive throttle. Represented by F. L. Bourne, F. A. Schaff, R. M. Osterman, G. E. Ryder, H. B. Oatley, C. H. True, N. T. McKee, C. A. Odell, Bard Brown, R. R. Porterfield, C. A. Brandt, W. A. Buckbee, Stett Macdonald, A. McLaughlin, C. H. Wickham, B. Lynch, W. Tawse, G. Fogg, J. Mourne, K. Stillwell, E. A. Averill, R. Van Meter, H. Spicer, H. V. Jones, W. Grove, C. David, I. D. Toner, W. Libby, E. Drewyour, E. A Baughn, T. F. Jackson, L. A. H. Weaver, and C. R. Fairchild.

Templeton-Kenly & Co., Ltd., Chicago—Jacks. Represented by J. L. Crowley.

Texas Oil Company, Chicago. Represented by H. A. Campbell, F. S. Freeman and W. L. Gibbs.

Transportation Devices Corporation, Indianapolis, Ind.—Mechanical cut-off control; cut-off indicator; superheater unit grinder; bell ringer. Represented by Frank H. Lutz and E. S. Pearce.

Union Asbestos & Rubber Co., Chicago—Asbestos packing and insulating material; mechanical rubber materials. Represented by G. J. Martin.

U. S. Metallic Packing Company, The, Philadelphia, Pa.—Packing for piston rods, valve stem and air pumps; hand-boring machine; oil cup; sanders; force feed lubricator; alloy steel springs. Represented by J. T. Luscombe, L. B. Miller, D. C. Thomas, O. J. Rudolph and H. E. Hyslop.

Universal Packing & Service Co., Chicago—Spring journal box packing. Represented by J. P. Landreth, W. H. Davis and W. M. Gibbs.

Vapor Car Heating Company, Inc., Chicago—Flexible metallic steam conduits for locomotive steam heat line; steam heat pressure reducing valves; steam heat stop valves; steam heat pressure gages; steam hose couplers. Represented by N. F. Burns, E. C. Post and L. B. Rhodes.

Viloco Railway Equipment Company, Chicago—Metallic piston rod and valve stem packing; sander; bell ringers; pneumatic whistle operating device; grease lubricator for piston rods. Represented by G. S. Turner, F. J. Kearney, A. G. Hollingshead, Chas. R. Long, Jr., J. S. Lemley, W. H. Heckman, C. W. Ploen, J. M. Monroe and G. P. Dirth.

Walworth Company, Boston, Mass.—Stillson wrench; railroad valves; pipe unions; tools; fittings. Represented by W. C. Mattox, J. A. Ellis, E. M. Switzer and W. M. Combs.

Westinghouse Air Brake Company, Wilmerding, Pa.—Brake cylinder packing cups and gaskets; centrifugal dirt collector; M-3 feed valve; leakage indicator for test rack; Type "B" pump lubricator; steel air valve cages; instruction books. Represented by S. G. Down, J. R. Holton, H. H. Burns, C. J. Werlich, F. S. Thomas, A. G. Huston, E. A. Maylock, L. M. Carlton, I. Simpson, V. Villette, R. I. Cunningham, T. G. Myles, F. B. Johnson, H. L. Fuller, F. H. Parke, A. L. Berghane, F. E. Yancy, C. D. Foltz, J. B. Wright, J. S. Y. Fralich, W. M. Sleet, F. B. Farmer, C. J. Olmstead, and E. H. Weaver.

Worthington Pumps & Machinery Corp., New York—Locomotive feed water heater and individual parts for same. Represented by D. R. Coleman, T. C. McBride, Paul Diserens, J. M. Lammedee, J. E. Buckingham, J. F. Cosgrove, F. P. Murray, C. E. Jackson, William Christianson, W. G. Clark, Geo. P. Bourne, J. P. Collins, Geo. P. Schumacker, J. A. Wilson, D. M. Cameron, Fred Worth, T. E. McGowan, C. I. Williams.

Wulff Engineering Company, Chicago—Automatic safety valves; water glass automatic guards. Represented by John P. Wulff.

Traffic News

Allegheny Shippers Advisory Board

The initial meeting of the organization committee of the Allegheny Shippers Advisory Board was held at the William Penn Hotel, Pittsburgh, Pa., on Friday, September 17, with more than 120 shippers, representatives of the American Railway Association, and railroad representatives, in attendance. Donald O. Moore, traffic secretary of the Pittsburgh Chamber of Commerce, was elected general chairman of the board; J. M. Belleville, general traffic manager, Pittsburgh Plate Glass Company, Pittsburgh, Pa., vice-general chairman; and Royal E. Cook, traffic manager of the H. J. Heinz Company, Pittsburgh, Pa., general secretary.

Boston & Maine Time Changes

The Boston & Maine announces that with its new time table, September 26, a number of new trains will be put on and that the Flying Yankee will run between Boston and Portland in two hours, 40 minutes, which is slightly less than the present schedule. Several through trains between Boston and Portland, by way of Portsmouth, are discontinued as the company is preparing to tear down the old wooden bridge across the Piscataqua river within a year or two. To replace this bridge would cost $1,500,000 which in view of the existence of a parallel double track line, is held to be unwarranted.

The White Mountain Express between New York, Springfield and White River Junction is to be run all the year round instead of being discontinued at the end of the summer. The Cannon Ball Express is re-established between Concord, N. H., and Boston, and a new fast train is to be run from Boston to Dover, as a first section of the Flying Yankee. The Pine Tree Limited has become so popular that the train following it gets few passengers and is being discontinued. Gasoline electric motor trains are being introduced on several sections.

Lackawanna Improves Passenger Service

The Delaware, Lackawanna & Western has adopted a program, effective September 26, for the improvement of its night service between New York and Buffalo. The program includes the introduction of a new train, the "Whitelight Limited," the speeding up of trains running on the present schedule, and definite connections at Hoboken with Hudson Tunnel trains from 33rd street and Broadway, and from Hudson Terminal, New York. The Lackawanna has unofficially adopted a new slogan: "A train for every purpose," and the Whitelight Limited is being inaugurated to provide an after-theater service and an early arrival in Buffalo. The new train will leave Hoboken at 11:45 p. m., and will await connections from Hudson Tunnel trains leaving 33rd street and Broadway at 11:23 p. m., and from Hudson Terminal at 11:31 p. m. Heretofore, the Lackawanna had no definite arrangement for regular connections with Hudson Tunnel trains.

The Western Express, which at present leaves Hoboken at 6:55 p. m., and arrives in Buffalo at 7:30 a. m., is to be replaced by the Buffalo Special which will leave Hoboken at 7:55 p. m. and arrive in Buffalo at 6:30 a. m., a saving of two hours. Definite connections with Hudson Tunnel trains are also provided. Several changes have been made in service from Buffalo to New York. The present No. 10 will be known as the Lackawanna Special, and will leave Buffalo at 7:40 p. m., instead of 5:50 p. m., arriving at Hoboken at 6:30 a. m., as formerly, cutting down running time 1 hour and 50 minutes. The present Number 12 will be known as the Garden State Limited, and will leave Buffalo at 9:15 p. m., arriving in Hoboken 7:51 a. m., instead of leaving Buffalo at 8:15 p. m., and arriving in Hoboken at 6:51 a. m. A change has been made to cut down time of the present Number 14, which will be known as the "Whitelight Limited" from Buffalo. This train will leave Buffalo at 11:30 p. m., as at present, but will arrive at Hoboken at 9:35 a. m. instead of 10:39 a. m.

Equipment and Supplies

Locomotives

THE NEW YORK CENTRAL has ordered one 4-6-4 type locomotive from the American Locomotive Company.

THE BELT RAILWAY OF CHICAGO is expected to enter the market soon for from five to ten eight-wheel switching locomotives.

Freight Cars

THE WABASH is reported to be building 24 caboose cars in its own shops.

THE PAULISTA RAILWAY (Brazil) is inquiring through the car builders for from 30 to 50 refrigerator cars.

W. W. BOXLEY & SONS have ordered six 20-cu. yd. lift door air dump cars, from the Koppel Industrial Car & Equipment Company.

THE AMERICAN REFRIGERATOR TRANSIT has ordered 500 refrigerator cars from the Pressed Steel Car Company, 500 from the General American Car Company and 1,000 from the American Car & Foundry Company. In the *Railway Age* of September 18, it was incorrectly reported that these cars would be built in the shops of the Missouri Pacific and the Wabash.

Passenger Cars

THE GREAT NORTHERN is inquiring for from one to five rail motor car trailers.

THE MIDDLETOWN & UNIONVILLE has ordered one combination passenger and baggage gasoline rail motor car from the J. G. Brill Company.

THE UNION PACIFIC has ordered seven steel baggage cars equipped with sleeping quarters, 69 ft. long, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of August 14.

Signaling

THE LEHIGH VALLEY has ordered from the General Railway Signal Company four position-light signals to be installed at Wilkes-Barre, Pa.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company a table interlocker, 11 levers, for Bay Bridge, Ohio.

THE CHARLES MEADS & COMPANY, contracting engineer, has ordered from the General Railway Signal Company an electric interlocking, 52 working levers, for installation on the line of the New York Rapid Transit Corporation at DeKalb avenue.

THE INTERBOROUGH RAPID TRANSIT COMPANY, New York City, has ordered from the Union Switch & Signal Company a complete electro-pneumatic interlocking for Times Square; 11 working levers. The order includes 13 electro-pneumatic automatic train stops.

THE PERE MARQUETTE has ordered from the General Railway Signal Company an electric interlocking, 26 working levers, for installation at Carleton, Mich.; crossing of the Pennsylvania and the D. T. & I. This order includes 14 color-light signals, three position-light signals and other apparatus.

Miscellaneous

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is receiving bids for the construction of a 110-ft. deck turntable for its Riverside engine terminal at Cincinnati, Ohio.

Supply Trade News

Hughes & Graul, Chicago, have been appointed representatives of the **Power Piping Company,** Pittsburgh, Pa.

Bruce Owens, sales manager of the Magnus Company, Inc., with headquarters at Chicago, has resigned to become vice-president of the **O'Malley Beare Valve Corporation,** Chicago.

Carl G. Schluederberg has been appointed general manager of the **George Cutter Company,** South Bend, Ind. This company is a subsidiary of the Westinghouse Electric & Manufacturing Company.

F. L. Townsend, sales engineer of the Condit Manufacturing Corporation, Boston, Mass., a subsidiary of the **American Brown Boveri Electric Corporation,** Camden, N. J., has been transferred to the New York office of the American Brown Boveri Electric Corporation and will conduct the sales of automatic voltage regulators, current limiting regulators and automatic synchronizers as well as other central station equipment. The American Brown Boveri Electric Corporation now has four district offices as follows: 165 Broadway, New York; 230 South Clark street, Chicago; 842 Summer street, Boston, Mass., and 922 Witherspoon building, Philadelphia, Pa.

Lauren J. Drake, president of the Galena Signal Oil Company, has been elected president of the **Union Tank Car Company,** with headquarters at Chicago, to succeed E. C. Sicardi, retired. **H. E. Felton** remains chairman of the board of directors. Lauren J. Drake was born at Keokuk, Iowa, on August 27, 1880. After attending public schools in Omaha, Neb., and Chicago, Ill., he became a student at the Shattuck Military School, Faribault, Minn., graduating in 1899. Mr. Drake then entered the oil business, acquiring by service with several important oil companies, a general and broad knowledge of the business in all its branches, specializing in the marketing end of the business. In 1905, he went to the Galena Signal Oil Company as a representative in the middle west and served until 1916, when he went to its executive offices in New York as vice-president and director of the company. On February 24, 1920, Mr. Drake was elected president of the Galena Signal Oil Company, with headquarters at New York, and on September 20, 1926, he was elected president of the Union Tank Car Company as above noted.

L. J. Drake

John R. Blair, of the sales department of the **Pittsburgh Steel Products Company,** Pittsburgh, Pa., has been appointed manager of sales, to succeed Charles F. Palmer, who has resigned. Mr. Blair was educated in the common school in Scotland and served with the Millom & Askam Hematite Iron Company in the northwest of England from 1895 to 1902. He entered the purchasing department of the Pressed Steel Car Company in 1902, where he stayed until 1908. For the past 18 years Mr. Blair has been connected with the sales department of the Pittsburgh Steel Products Company and its predecessor the Seamless Tube Company of America, and for several years has been acting as assistant to the general manager of sales.

Obituary

Henry Robbins Wardell, a director and consultant on roofing and waterproofing material for Johns-Manville, Inc., New York, died on September 13 at Loon Lake, N. Y. Mr. Wardell was born at Long Branch, N. J., in 1865. He became identified with the Buffalo Pitts Road Roller Company, the Barber Asphalt Company, the Johns-Manville Company and the Central Commercial Company of Chicago, remaining in active business until three years ago, when ill health compelled him to relinquish some of his interests. He served in an advisory capacity with the two last named companies until his death.

Trade Publications

DROP PIT TABLE.—The construction and operation of the Whiting electric drop pit table for locomotive and car shops, its advantages and savings, are described in Catalogue No. 177 issued by the Whiting Corporation, Harvey, Ill.

TRAVELING GRATE STOKER.—The construction and operation of the Coxe stoker for boilers from 150 hp. up, are described and illustrated in Catalogue C-4 which has been issued by the Combustion Engineering Corporation, 43 Broad street, New York. This stoker is designed to burn a wide range of fuels, especially small sizes of anthracite coal and coke breeze.

BITULUMIN.—A 30-page brochure, giving 77 questions and answers on aluminum paints and metal primers, has been issued by Hill, Hubbell & Co., San Francisco, Cal. Through these questions and answers considerable non-technical information is given on the mixing of aluminum paints, the application of Bitulumin and the principles of painting iron and steel. The illustrations in the booklet are reproductions of the photographs showing the actual use of Bitulumin and Two-Fifty iron primer.

ENGINE INDICATORS.—The design and construction of the Maihak engine indicator, its parts and accessories, also the Maihak automatic power integrator, are clearly described and illustrated in Bulletin No. 261 which has been issued by the Bacharach Industrial Equipment Company, 7000 Bennett street, Pittsburgh, Pa. The automatic power integrator is designed to correctly measure mean indicated horsepower over any period of time for any steam engine, regardless of variation of load, and for any oil engine, regardless of any change within the engine cylinder.

ELECTRIC EQUIPMENT.—Complete information on locomotive headlight mountings and recommended wiring for locomotive lighting, etc., together with tables, diagrams and material lists, is presented in the third edition of catalogue No. 101 which has been completed by the Pyle-National Company, 1334 North Kostner avenue, Chicago. A number of recent developments in locomotive headlight case construction are described in this edition, which includes also data on the Pyle-National line of turbo-generators and yard floodlights and a representative selection of the Oliver wiring appliances for locomotive, car and shop wiring.

THE CHICAGO & EASTERN ILLINOIS has inaugurated fast freight service from Chicago to the southeast and the Mississippi valley to afford a time-saving connection with late night and early morning fast inbound trains connecting with the Chicago & Eastern Illinois at Chicago. The train carries carload shipments of automobiles and other high-class commodities and makes connections with fast trains of other roads at several points. The train leaves Chicago daily at 8:15 a. m. and arrives in Evansville, Ind., at 11 p. m.; Nashville, Tenn., at 8:05 a. m. the next day; Chattanooga, Tenn., at 5:30 p. m.; Birmingham, Ala., at 5:40 p. m.; Montgomery, at 10:30 p. m.; Atlanta, Ga., at 2:10 a. m., the third morning; Mobile, Ala., at 11:15 a. m.; New Orleans, La., at 9:15 p. m., and Jacksonville, Fla., on the fourth day.

THE PROPOSED INCREASE in prices of commutation tickets on the Long Island has, by order of the State Public Service Commission, been further postponed to December 31.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—Bids are being received until September 30 for the construction of a frog and switch shop at Newton, Kan.

BOSTON & ALBANY.—A contract for the construction of an enginehouse at Framingham, Mass., has been awarded to the J. G. Roy & Sons Co., Springfield, Mass.

CANADIAN PACIFIC.—Bids have been closed for the construction of a yard at Kimberley, B. C., involving an expenditure of about $60,000. The construction will include three storage tracks, a coaling plant, an ash-pit, water tank and a change in the location of the turntable.

CHICAGO & NORTH WESTERN.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of a 60-ft. by 35-ft. steam power plant at Antigo, Wis., at a cost of about $90,000.

CHICAGO & EASTERN ILLINOIS.—The general contract for the construction of engine terminal facilities at Evansville, Ind., involving a total expenditure of about $513,000, has been awarded to G. A. Johnson & Son. This project involves the construction of a 16-stall roundhouse, a powerhouse, a small machine shop, a 90-ft. continuous girder turntable, and a 400-ton coaling station.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been let to Jerome A. Moss, Chicago, for the construction of an addition to the Englewood station, Chicago, to house comfort station facilities. This work involves an expenditure of $15,000.

DELAWARE & HUDSON.—This company has filed with the Public Service Commission of New York an application for permission and approval of a change in location of its tracks and crossing on County Highway No. 1224 at a point known as "Ray Crossing," about one mile north of Comstock in the town of Fort Ann. It is proposed to reduce the curve in the tracks between Comstock and Whitehall stations and change the grade of same, which will necessitate relocating the crossing about 50 ft. westerly of the present crossing.

FORT WORTH & DENVER CITY.—Bids closed on September 25 for the construction of a 5-stall brick roundhouse at Amarillo, Tex., estimated to cost $30,000.

GRAND TRUNK WESTERN.—This company has awarded a contract to the R. C. Huffman Construction Company, Elyria, Ohio, for the construction of a 106 ft. double-barrel concrete box culvert under three tracks east of Durand, Mich., and for the replacing of a masonry pier and abutment west of the same point with a concrete pier.

ILLINOIS CENTRAL.—A contract has been let to Joseph E. Nelson & Sons, Chicago, for the construction of two 50,000-gal. wood tanks, two 12-in. water columns and 5,000 ft. of 6-in. and 12-in. pipe line at Morganfield, Ky., at a cost of $22,000.

ILLINOIS CENTRAL.—A contract has been awarded to the Bates & Rogers Construction Company, Chicago, for the elimination of four grade crossings to be replaced by highway subways at Clarksdale, Miss.

LONG ISLAND.—This company has awarded a contract to Gibbs & Hill for the electrification of the Bay Ridge division, from Hell Gate bridge to Bay Ridge. The electrification plans include overhead trolley wires. The company is also installing double track from Lynbrook to Long Beach. This work is being done by company forces.

LONG ISLAND.—This company has awarded contracts to the William F. Kenny Company for construction of two steel and concrete bridges near Winfield, L. I., at an estimated cost of $500,000. Two additional bridges, one in Forest Park on the Montauk division, and another on the Rockaway Beach division, are now under construction, contracts having been awarded to Henry Steers, Inc. Another bridge over the Riverhead-Mattituck highway, eliminating a grade crossing at Broadway, Elmhurst, is now complete.

LOUISVILLE & NASHVILLE.—Bids are being received until October 4 for the realignment of one and one-half miles of line near Sinks, Ky., involving a tunnel 359 ft. long.

MINNEAPOLIS & ST. LOUIS.—A contract has been let to the Howlett Construction Company, Moline, Ill., for the construction of a mechanical coaling station at Ft. Dodge, Iowa, at a contract price of $14,366.

MINNEAPOLIS & ST. LOUIS.—A contract has been awarded to the Industrial Contracting Company for the renewal of the floor system of the Fourth street bridge in Minneapolis, Minn., at a cost of $8,300.

MINNEAPOLIS & ST. LOUIS.—A contract has been let to the American Bridge Company, Chicago, for the construction of a bridge near Steamboat Rock, Iowa, composed of three 60-ft. spans replacing lighter spans and involving an expenditure of about $10,900.

MERIDIAN & BIGBEE RIVER.—Bids are being received for the construction of a line 50 miles in length from Meridian, Miss., to Myrtlewood, Ala., at an estimated cost of $1,250,000. The line as projected will connect with the Southern, the Illinois Central, the Mobile & Ohio and the Gulf, Mobile & Northern at Meridian, with the Alabama, Tennessee & Northern at Cromwell, Ala., with the Sumter & Choctaw at Choctaw City, Ala., with the Tombigbee River barge line of the Inland Waterways at Naheola, Miss., and with the Louisville & Nashville at Myrtlewood.

MISSOURI PACIFIC.—A contract has been awarded to Jerome A. Moss, Chicago, for the construction of a concrete spray pond at Sedalia, Mo., at a cost of about $15,000.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—Company forces will be employed in the rearrangement of the passenger station at Chattanooga, Tenn., at a total cost of $210,000. The work will involve track changes, remodeling of station building and adjacent structures, replacing the high truss train shed by umbrella sheds and renewing and extending the platforms.

PENNSYLVANIA.—This company has awarded contracts as follows: to the Arundel Corporation, Baltimore, Md., by agreement with the Philadelphia Electric Power Company and the Susquehanna Power Company, for the relocation of the Columbia and Port Deposit branch from Fishing Creek, Pa., to Tome Institute, Md., a distance of 16 miles, at an estimated cost of $5,000,000; to the Coliami & Dire Company, Chicago, for grading and track work in connection with track elevation between 49th and 50th streets, Chicago, at an estimated cost of $60,000; to the Milliron Construction Company, Dubois, Pa., for relocation of tracks to eliminate grade crossing between Renova and Keating, Pa., at an estimated cost of $65,000.

PENNSYLVANIA.—Bids closed on September 22 for a change of alignment over a distance of five miles at Collinsville, Ill. With rails and ties the cost is expected to approximate $1,000,000.

SOUTHERN.—A contract has been let to William Toelle, Princeton, Ind., for alterations and a second-story addition to the brick freight station at East St. Louis, Ill.

PERE MARQUETTE.—A contract has been awarded to the Ferguson & Edmondson Company for grading and culvert construction for a new yard at Flint, Mich. This portion of the work is estimated to cost $200,000.

SOUTHERN ILLINOIS & KENTUCKY.—A contract has been awarded to Joseph E. Nelson & Sons, Chicago, for the construction of a 100,000-gal. steel water tank, a brick pump house and installation of a water column and pipe lines at Thompsonville, Ill., at a cost of $42,000.

SOUTHERN PACIFIC.—This company contemplates the construction early in 1927 of a passenger station at Brawley, Cal., which will include track rearrangement, concrete curbs, platforms and paving. Similar passenger station facilities are contemplated for El Centro, Cal., construction to start within two months. The expenditure for the two stations is expected to be about $118,000.

Railway Financial News

CANADIAN PACIFIC.—*Bonds Sold.*—The National City Company, the Guaranty Company and the Bank of Montreal have sold $20,000,000 20-year 4½ per cent collateral trust gold bonds at 96½ to yield 4.77 per cent.

The financing is to provide funds to pay for steamships, for trans-Atlantic service for branch lines and for other corporate purposes.

The bonds will be specifically secured under a trust indenture by deposit with the National City Bank as trustee, of 25,000,000 Canadian Pacific Railway Company 4 per cent consolidated debenture stock. Interest on the debenture stock is a first charge, subject to interest on certain underlying obligations aggregating $38,641,725, upon the net earnings and special income of the company, which in 1925 were $51,512,150.

The new issue of bonds has priority over $100,148,587 preference stock and $260,000,000 common stock, representing an equity at present market prices in excess of $510,000,000.

CHICAGO, MILWAUKEE & ST. PAUL.—*Road's Counsel Reviews I. C. C. Hearings.*—Two of the last remaining contentions raised by critics of the Chicago, Milwaukee & St. Paul and its receivership difficulties have been clarified considerably as a result of the hearings just closed in New York by the Interstate Commerce Commission, according to a summary of these proceedings issued by O. W. Dynes, general counsel for the road.

One of these points Mr. Dynes points out was the charge in effect that wasteful methods were used in the construction of the Puget Sound extension. The other, the claim advanced by those opposing the receivership reorganization plan that electrified operation of that part of the system has cost the railway more than steam would have cost and was uneconomical. Mr. Dynes' statement said:

"The outstanding feature of the hearings here in New York was the testimony of E. J. Pearson, president of the New York, New Haven & Hartford, who was called by the commission. Mr. Pearson was chief engineer in charge of the construction of the Puget Sound lines to the Pacific coast.

"Mr. Pearson was very clear in his testimony that only contractors of experience, efficiency and integrity were employed, that sub-contractors' work was very carefully checked by the railroad's engineering force constantly on the ground as the work progressed, and he was convinced that the construction work was done at as low a cost for each class of work as it was possible to obtain. He stated that the items of cost in these respects compared very favorably with those encountered by numerous other roads conducting large construction programs in the far Northwest at the same time. He mentioned that a careful check was maintained continuously to guard against errors of classification and overpayment in all parts of the construction work under his supervision.

"The commission also called its own experts as witnesses to check up the correctness of the evidence previously introduced by the railway company in respect of the savings accomplished by the electrification as compared with steam operation over the five mountain ranges. In substance, the witnesses testified they found no errors in the study by the company's engineers which was made the basis of the railway's evidence.

"Their conclusion was that the evidence showed a saving of approximately a million dollars for the year 1923, comparing the electrified service with the steam service it had displaced, and they expressed the opinion that the most modern steam locomotives of the present day could not do the work on the electrified lines more economically than it is being done at present.

"The Interstate Commerce Commission's experts also gave as their opinion that as the volume of tonnage increases on the electrified portion of the system the economy of electricity over steam operation will be still greater than at present."

GRAYSONIA, NASHVILLE & ASHDOWN.—*Securities.*—This company has been authorized by the Interstate Commerce Commission to issue 1,000 shares of common stock of the par value of $100 and $100,000 of general mortgage bonds to be used in connection with the purchase of its line between Ashdown, Tenn., and Nashville, 27 miles. This line was formerly a part of the Memphis, Dallas & Gulf. By arrangement with the latter company, it was operated by the new company between Ashdown and Shawmut, 61 miles. Some of the line was later sold and a portion junked.

MISSOURI PACIFIC.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority for the acquisition of control of the New Orleans & Lower Coast, a line of 66 miles between Algiers and Burras, La., by purchase of its stock and bonds for $300,000.

NORTHWESTERN TERMINAL.—*Sale.*—This company's 7.83 miles of line between Denver, Colo., and Utah Junction, together with 233 acres of land and improvements, was sold at auction on September 16 at the upset price of $450,000 fixed by the court to S. M. Perry and W. M. Bond, representing the reorganization committee. The company is leased to the Denver & Salt Lake until 1964 and its facilities are being used by the latter company between Denver, Colo., and Utah Junction.

OLEAN, BRADFORD & SALAMANCA.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its Little Valley division, from Salamanca, N. Y., to Little Valley, 9 miles, on the ground that most of the traffic for which the line was built has been taken by automobiles.

PENNSYLVANIA.—*Director Deceased.*—Bayard Henry, a director since 1915, died in San Francisco on September 17.

ST. LOUIS SOUTHWESTERN.—*Minority Stockholders Object to Proposed Merger.*—A petition filed with the Interstate Commerce Commission in behalf of the minority stockholders of this company asks for leave to intervene in the proceedings upon the merger applications of the Missouri-Kansas-Texas and the Kansas City Southern and that the applications be denied. A statement issued by Walter E. Meyer, a New York attorney and a Cotton Belt director, outlines the petition as follows:

"The grounds for opposition are that the grouping of the three companies would be against the public interest; that it would disrupt existing routes and channels of trade and commerce and eliminate competition; would not make for economy, increased efficiency, and better service to the public; would confirm an unduly concentrated control of the three properties; and would greatly damage the minority stockholders of the St. Louis Southwestern.

"The Loree plan does not conform to the tentative consolidation plan of the commission but departs from it by including the Kansas City Southern, which was assigned to the Missouri Pacific system, and by excluding the St. Louis-San Francisco, which formed the nucleus of the Frisco-Katy-Cotton Belt system. Moreover, the Cotton Belt has very important and close traffic relations with the Southern Pacific which are endangered by the proposed grouping.

"It is worthy of note that the application of the Katy contains no provision for the protection of the minority stockholders of the Cotton Belt. Pending a more logical and advantageous grouping, from the standpoint of the public and the stockholders, then the grouping proposed by the Loree plan, it is believed that the Cotton Belt, freed from the present domination and control, will be fully able to maintain its position as an independent railroad, and continue to earn sufficient to warrant the payment of a dividend on the common stock."

SMOKY MOUNTAIN.—*Abandonment.*—This company has been authorized by the Interstate Commerce Commission to abandon its line from a connection with the Carolina & Tennessee Southern at Ritter to Bone Valley, 9.6 miles, all in Swain County, N. C. The road was built to serve lumber operations which have since ceased.

SOUTHERN.—*Preferred Stockholders' Injunction Denied.*—Judge Beverley T. Crump, in the Law and Equity Court at Richmond, has denied the petition of Arthur Lyman of Massachusetts and other preferred stockholders asking for an injunction restraining the company from paying more than 5 per cent dividends on its common stock until the claims of the preferred stock for any excess earnings above that amount have been discharged. In summarizing his decision, Judge Crump said:

"Upon the whole case I am constrained to the conclusion that the contract by which the rights of the preferred stockholders and common stockholders are expressed is plainly to the effect that when the preferred stockholders receive their full dividend up to the limit of 5 per cent out of the earnings for any one year, then the board of directors can declare out of the surplus of such net earnings remaining after the full preferred dividends have been paid, such dividends upon common stock as in their discretion they may deem proper and right. The contract was so written and the court has no right to change it. The injunction prayed for, therefore, is denied."

In his decision, he reviewed the clauses in the stock contract and the charter of the company and on these points expressed his opinion as follows:

"There is no question here of limitation of usual rights attaching to stock. On the contrary, the court is asked to limit a dividend right expressly given to other stock than the preferred, which can only be done by adding a restrictive provision not in the contract. . . . "These contract provisions should not be too technically viewed in deciding the

question at issue in this case, but we should interpret the language as the average man in the investing public would interpret it.

"The earnings of the Southern Railway have been in the past two or three years exceedingly large; so seems to have been the case with a number of trunk lines of the country in these days of apparently overwhelming prosperity.

"This seems to put the common stockholder of the defendant company in a very advantageous position, if the preferred stockholder is confined to the 5 per cent dividend. It may be well, and I have no doubt, a fact that in 1894 it was never contemplated by the organizers of the Southern Railway, or by its stockholders, that the corporation would earn net profits subject to distribution among its stockholders as it is now earning. It must be remembered that the defendant company is a public service corporation, that it is not only subject to the vicissitudes of trade and the depreciation of business and consequent lessening of all traffic, but it is also subject to public control in regard to its earnings as well as its operating functions."

Judge Crump also outlined the contention of the opposing parties in the following language:

"The contention of the plaintiffs is that, as holders of preferred stock, they should have the right to participate ratably in all excess dividends declared by the board of directors out of the profits for any one year, after the board has satisfied a 5 per cent preference which attaches to their stock and has paid the common stock a like dividend of 5 per cent; in other words, that the preferred stock is what is ordinarily called participating stock.

"The defendants claim, on the other hand, that, after the preferred stock has received its 5 per cent dividend in any one year from the net profits of that year, then the board of directors has no right to declare a further dividend on the preferred stock in addition to the 5 per cent dividend, but that the surplus net profit remaining after the payment of the 5 per cent preferred dividend is subject to such dividend payment in favor of common stockholders as the board of directors may declare. Defendant, therefore, claims that the preferred stock is non-participating stock."

WEATHERFORD, MINERAL WELLS & NORTHWESTERN.—*Equipment Trust.*—The Interstate Commerce Commission has authorized the issuance of $572,000 equipment trust certificates, series A, to be delivered to the American Car & Foundry Company in connection with the purchase of 300 furniture cars having a total approximate cost of $858,410.

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports placing the final value for rate-making purposes of the property owned and used for common-carrier purposes, as of the respective valuation dates, as follows:

Cumberland & Pennsylvania	$4,105,700	1918
Frankfort & Cincinnati	1,182,950	1917
Toledo, Angola & Western	138,230	1917

Dividends Declared

Akron, Canton & Youngstown.—4 per cent, payable October 1 to holders of record September 15.

Arkansas Central.—Prior preferred, $1.75, quarterly, payable October 1 to holders of record September 22.

Boston & Providence.—2½ per cent, quarterly, payable October 1 to holders of record September 20.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, 1¼ per cent, quarterly; preferred, 1¼ per cent, quarterly, both payable October 20 to holders of record October 5.

Consolidated Railroads of Cuba.—Preferred, 1½ per cent, quarterly, payable October 1 to holders of record September 17.

Cuba Railroad.—Common, $1.40, payable September 25.

Kansas City Southern.—Preferred, $1, quarterly, payable October 15 to holders of record September 30.

Meadville, Conneaut Lake & Linesville.—2 per cent, payable October 1 to holders of record September 15.

Missouri-Kansas-Texas.—Preferred A, $1.50, quarterly, payable November 1 to holders of record October 15.

Mohawk Valley.—$0.50, quarterly, payable October 1 to holders of record September 21.

New York Central Railroad.—1¾ per cent, quarterly, payable November 1 to holders of record October 5.

Northern Pacific.—1¼ per cent, quarterly, payable November 1 to holders of record September 30.

Philadelphia & Western.—Preferred, 1¼ per cent, quarterly, payable October 15 to holders of record September 30.

Providence & Worcester.—2½ per cent, quarterly, payable September 30 to holders of record September 8.

Vermont & Massachusetts.—3 per cent, payable October 7 to holders of record September 9.

West Jersey & Sea Shore.—2½ per cent, semi-annually, payable October 15 to holders of record October 1.

Western Pacific Railroad Corp.—Preferred, 1½ per cent, quarterly payable October 20 to holders of record October 7.

Average Price of Stocks and Bonds

	Sept. 21	Last Week	Last Year
Average price of 20 representative railway stocks	103.35	104.13	88.00
Average price of 20 representative railway bonds	98.02	98.07	91.68

Railway Officers

Executive

Edward M. Durham, Jr., assistant to the president of the Missouri Pacific, with headquarters at St. Louis, Mo., has been promoted to the newly created position of vice-president of the Missouri Pacific, the Gulf Coast Lines and the International Great Northern, with the same headquarters. Mr. Durham, who was born on October 23, 1875, at Memphis, Tenn., graduated from Lehigh University in 1896. He served from 1896 to 1897, with the War Department, as a member of a party which made a hydrographic survey of the Ouachita river, and until 1899, as recorder for the deep waterways commission of the state of New York. He began his railway career in that year as a transit man with the Chicago & North Western and in 1900, was appointed an assistant engineer on the Southern. From that time until 1920, he was promoted successively to resident engineer, principal assistant engineer, assistant chief engineer and chief engineer. His railway service during that time included two years as valuation engineer for the Atlanta, Birmingham & Atlantic, and two years as executive general agent for the Southern. In 1920, he was appointed manager of the department of way and structures of the United States Railroad Administration, with headquarters at Washington, D. C. In November, 1923, he was made director of the division of liquidation claims, where he remained until 1924, when he was appointed assistant to the president of the Missouri Pacific, which position he held until his promotion to vice-president.

E. M. Durham, Jr.

Robert V. Massey, who has been appointed assistant vice-president in charge of personnel of the Pennsylvania, a newly created position, with headquarters at Philadelphia, Pa., was born at Dover, Del., on September 29, 1871, and was graduated from the Sheffield Scientific School of Yale University in 1892. He began railroad work in the construction department of the Pennsylvania on September 1, 1892, and remained in that department until August, 1895, when he was transferred to the maintenance of way department, in the office of the assistant engineer at Altoona, Pa. In November of the same year he was appointed assistant supervisor at Freeport, Pa., and in April, 1897, was transferred to Baltimore, Md., as assistant supervisor of the Baltimore division of the Northern Central. He was transferred to Mifflin, Pa.,

R. V. Massey

as assistant supervisor of the Middle division of the Pennsylvania on April 1, 1899, and in 1900 was promoted to supervisor of the Schuylkill division. He then went with the Philadelphia, Baltimore & Washington in the same capacity, and in 1905 was transferred as supervisor of the Pittsburgh yard. On April 1, 1907, he was promoted to division engineer on the Schuylkill division and was transferred to the New York division on January 1, 1909. In March, 1911, he was appointed superintendent of the New York, Philadelphia & Norfolk and the Cape Charles, with headquarters at Cape Charles, Va. On February 11, 1914, he became superintendent of the Manhattan division, with headquarters in New York, and in May, 1916, when the Manhattan and New York divisions were consolidated, his title was changed to superintendent of the New York division. He was appointed general superintendent of the Eastern Pennsylvania division, with headquarters at Altoona, Pa., in June, 1917. On July 1, 1918, he was transferred to the New Jersey grand division in the same capacity, and on March 1, 1920, he was promoted to assistant general manager of the Eastern Region. Three years later, Mr. Massey was appointed general manager of the Eastern Region, which position he held until his recent promotion.

Harry H. Shepard, who resigned on August 1 as general superintendent of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., has been elected vice-president and general manager of the Brooklyn Eastern District Terminal, with headquarters at Brooklyn, N. Y.

Financial, Legal and Accounting

W. H. Whitehead, general auditor of the Lehigh & New England, with headquarters at Bethlehem, Pa., has resigned to accept service elsewhere. **C. A. Andrews** has been appointed auditor in charge of the accounting department, with headquarters at Bethlehem, Pa.

H. B. Johnson, assistant controller of the Southern Pacific, with headquarters in New York, has been promoted to controller, to succeed G. W. Mulks, resigned. He will assume his new duties October 1. Mr. Johnson was born November 17, 1870, at Troy, Kans., and entered railroad service in 1892, with the Kansas City, Ft. Scott & Memphis. From 1892 to 1896, he filled the positions of payroll clerk, bill clerk, voucher clerk, assistant bookkeeper and general bookkeeper of this railroad, with headquarters at Kansas City, Mo. From 1896 to 1899 he served as general bookkeeper and chief clerk, respectively, in the auditor's office of the Kansas City, Pittsburgh & Gulf, with headquarters in Kansas City, Mo., and in 1899 he went with the Omaha, Kansas City & Eastern and the Omaha & St. Louis as auditor and treasurer, with general headquarters at Quincy, Ill. From 1900 to 1905 Mr. Johnson served as auditor of disbursements, and later, as auditor of the Kansas City Southern, with headquarters at Kansas City, Mo., during the time when this company was controlled by the late E. H. Harriman. When the Harriman control of the Kansas City Southern was taken over by other interests. Mr. Johnson was transferred to the controller's office of the Union Pacific-Southern Pacific lines at New York. In February, 1907, he received the appointment of assistant controller of the Southern Pacific, serving in this capacity continuously until the time of his recent appointment as controller, succeeding Mr. Mulks.

Operating

S. L. Clayton has been appointed assistant trainmaster on the Southern Pacific, Pacific system, with headquarters at Crescent Lake, Ore.

Bernard R. Tolson, chief clerk of the Washington Terminal Company, Washington, D. C., has been appointed manager of this company, succeeding J. H. Tonge, deceased.

A. F. Judd, assistant superintendent of the Gulf Coast Lines, with headquarters at DeQuincy, La., has been promoted to superintendent of the Houston division of the International-Great Northern, with headquarters at Houston, Tex., succeeding **James E. Callahan,** deceased.

James H. Greer has been appointed headquarters trainmaster of the Waterbury division of the New York, New Haven & Hartford, succeeding **John W. Carr,** deceased. **Herbert C. Fenn** has been appointed trainmaster, succeeding Mr. Greer, and **Jesse Brink** has been appointed assistant trainmaster.

C. I. Leiper, who has been appointed to the newly created position of general manager of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., was born at Wallingford, Pa., on October 28, 1874. He was graduated from Swarthmore College in 1895, after which he took a special course at the University of Pennsylvania. In 1897, he first entered railroad service in the construction department of the Pennsylvania. He went to Altoona, Pa., as transitman in February, 1901, and the following March was made assistant supervisor on the Maryland division. He was promoted to supervisor of the same division in 1903, later serving on the Pittsburgh division and the New York division. In August, 1909, he was appointed division engineer on the Manhattan division, and in 1911 he went to the New York division in the same capacity. He was appointed principal assistant engineer of the Philadelphia, Baltimore & Washington on June 16, 1913, and the following February was appointed superintendent of the New York, Philadelphia & Norfolk, with headquarters at Cape Charles, Va., from which position he was promoted on June 16, 1914, to superintendent of the New York division of the Pennsylvania. In February, 1920, he was promoted to general superintendent of the New Jersey division, Eastern region, and in October, 1923, he was appointed assistant general manager of the Eastern region which position he held at the time of his recent promotion.

C. I. Leiper

E. W. Smith, who has been appointed general manager of the Eastern Region of the Pennsylvania, was born in Clarksburg, W. Va., on September 21, 1885. He was graduated from the Virginia Polytechnic Institute in 1905, and entered railroad service with the Pennsylvania on June 1, 1905. After being advanced through several grades in the motive power department, he served as assistant master mechanic, with headquarters at Wilmington, Del., from October, 1913, to April, 1915. On April 19, 1915, he was transferred to the Altoona, Pa., shops where he served as assistant master mechanic until July, 1916, when he became assistant engineer of motive power. On October 10, 1917, he was transferred to Harrisburg, Pa., as master mechanic in which capacity he served until May 26, 1918, when he was transferred to Williamsport, Pa., where he served as superintendent of motive power. On December 1, 1919, he was transferred to Altoona, Pa., as superintendent

E. W. Smith

of motive power, and on March 1, 1920, he was promoted to engineer of transportation on the staff of the vice-president in charge of operation, with headquarters in Philadelphia. He was appointed general superintendent of motive power, with headquarters at St. Louis, Mo., October 15, 1922, and in June, 1924, was promoted to general superintendent of the Western Pennsylvania division, which he held until his recent promotion to general manager of the Eastern Region.

Arthur L. Johnson, who has been appointed general superintendent of the Denver & Salt Lake, with headquarters at Denver, Colo., was born on January 3, 1889, at San Diego, Cal., and was educated in the Denver public schools. He entered railway service on October 27, 1917, as secretary to the purchasing agent of the Denver & Salt Lake and was promoted to chief clerk of the purchasing and stores department in June, 1918. In October, 1918, he was transferred to the transportation department as secretary to the general superintendent and in the following year he was promoted to chief clerk where he remained until November, 1920, when he was promoted to assistant to the general superintendent. In April, 1926, he was promoted to acting general superintendent, a position he held until his recent appointment as general superintendent.

Robert C. Barnard, who has been promoted to the newly created position of general agent and superintendent of the Cincinnati division of the Pennsylvania, with headquarters at Cincinnati, Ohio, was born on February 5, 1869, at Montreal, Que., and was educated at Worcester Polytechnic Institute, Worcester, Mass. He entered railway service in 1890 as an assistant on the engineering corps of the Pennsylvania Lines West of Pittsburgh, where he remained until June, 1895, when he was promoted to assistant engineer on the Chicago division of the Pittsburgh, Cincinnati, Chicago & St. Louis (now a part of the Pennsylvania). In July, 1898, he was promoted to engineer of maintenance of way of the Richmond division, and in April, 1900, he was transferred to the Cincinnati division. From May, 1902, to December, 1903, he served as superintendent of the Marietta division of the Pennsylvania, and for the next three years as superintendent of the Cleveland, Akron & Columbus (now part of the Pennsylvania). In January, 1906, he was made superintendent of the Cincinnati division of the Pittsburgh, Cincinnati, Chicago & St. Louis and the Cincinnati, Lebanon & Northern, and in March, 1920, when these two roads were combined with the Cincinnati division of the Pennsylvania, he was appointed superintendent, which position he held until his recent appointment as general agent and superintendent. From 1911 to 1918, he also served in the position of secretary of the Dayton Union.

R. C. Barnard

A. J. Chester, who has been promoted to superintendent of the Louisiana division of the Texas & Pacific, with headquarters at Alexandria, La., was born January 1, 1880, at Jackson, Tenn., and entered railway service in 1897 as a clerk in the freight office of the Mobile & Ohio, at Jackson. From May, 1898, to April, 1903, he served successively as clerk, cashier and ticket seller of the Nashville, Chattanooga & St. Louis, at the same place. For three months during 1903, he was clerk on the Illinois Central and in the same year, he became chief clerk and agent on the Mobile & Ohio, where he remained until August, 1914, when he was promoted to traveling freight agent and commercial agent. In October, 1917, he was appointed agent on the Texas & Pacific, at Ft. Worth, Tex., and in May, 1919, he was made service supervisor, a position he held until March, 1920, when he was promoted to general agent. On October 1, 1920, he was promoted to superintendent of transportation, with headquarters at Dallas, Tex., where he remained until his promotion to superintendent.

Traffic

William C. Bowles, assistant freight traffic manager of the Canadian Pacific, who has been promoted to special freight traffic representative, was born on June 3, 1875, at Montreal, Que. He entered railway service in 1891 as a clerk in the general freight office of the Canadian Pacific at Montreal and in 1896 he was appointed chief clerk to the general agent, freight department at Chicago. The next year he was transferred to Winnipeg, Man., and from that time until 1903 he served as rate clerk in the office of traffic manager and chief clerk to the general freight agent at Winnipeg. He was then promoted to assistant general freight agent at Calgary, Alta., later being transferred in a similar capacity to Vancouver, B. C., where he remained until 1907 when he was promoted to general freight agent at Nelson, B. C., serving there, at Winnipeg and at Vancouver. In 1911, he was made general freight agent of the Western lines at Winnipeg and in 1922 he was promoted to assistant freight traffic manager of the Eastern lines at Montreal, a position he held until the time of his recent promotion to the position of special freight traffic representative.

William C. Bowles

Hugh W. Gillis, who has been promoted to assistant freight traffic manager on the Canadian Pacific, with headquarters at Montreal, Que., was born December 7, 1889, at Richmond, Que., and entered railway service on May 15, 1905, as a call boy on the Canadian Pacific at Mile End, Que. From June, 1906, to May, 1908, he served successively at Montreal as a messenger, and assistant biller and as a junior clerk. He was then transferred to Outremont, Que., where he remained until November, 1909, as billing clerk and car index clerk, when he was transferred back to Montreal, as clerk in the general freight office. For the next two years he acted successively as a tracing clerk and as a routing clerk in the general freight office, and in 1911 he was made a rate clerk in the division freight office. In July, 1914, he was promoted to assistant chief clerk in the freight traffic manager's office and a year later he was again promoted to chief clerk in the same office. He was transferred to the office of the vice-president in charge of the traffic department in September, 1918, and one year later he was promoted to assistant foreign freight agent,

H. W. Gillis

with headquarters at Montreal. In February, 1922, he was made assistant general freight agent, where he remained until September 1, 1926, when he was promoted to assistant freight traffic manager.

John H. Dunphy, who has been promoted to general passenger agent of the Pere Marquette, with headquarters at Detroit, Mich., was born on July 4, 1867, at Chicago, and was educated in the public schools of Chicago and Detroit. He entered railway service in May, 1882, in the general ticket department of the Detroit, Lansing & Northern (now a part of the Pere Marquette). He served here and in the accounting and treasury departments until September, 1892, when he was appointed assistant rate clerk in the passenger department of the Chicago & West Michigan (now a part of the Pere Marquette) at Grand Rapids, Mich., and was promoted successively to rate clerk, chief rate clerk and chief clerk in the passenger department, with the same headquarters. He remained there until September, 1900, when he became a member of the staff of the passenger department of the Pere Marquette. In December, 1915, he was promoted to assistant general passenger agent, with headquarters at Detroit, a position he held until his recent promotion to general passenger agent.

Engineering, Maintenance of Way and Signaling

Ed Kelly, superintendent of the treating plant of the Atchison, Topeka & Santa Fe, at Albuquerque, N. M., has been promoted to assistant manager of treating plants, with headquarters at Topeka, Kan., succeeding **S. D. Cooper,** deceased.

I. W. Geer, who has been promoted to assistant chief engineer of the Pennsylvania, with headquarters at Chicago, was born on February 1, 1873, at Plainfield, Conn., and graduated from Yale University in 1895. He began railway work in the same year with the Pennsylvania Lines West of Pittsburgh as rodman on the staff of the chief engineer. In 1897, he was promoted to assistant on the engineering corps of the Erie & Ashtabula division and in 1898, he was promoted to assistant engineer. From that time until 1901, he served as assistant engineer on the same division, when he was appointed engineer maintenance of way, and in 1902 he was transferred to the Pittsburgh division in the same position. During 1904 he served as superintendent of the Terre Haute & Logansport and the Logansport & Toledo (now parts of the Pennsylvania) and for the next two years he was superintendent of the Michigan division of the Vandalia (now a part of the Pennsylvania). In 1906 he was appointed superintendent of the Logansport division of the Pittsburgh, Cincinnati, Chicago & St. Louis, with headquarters at Logansport, Ind., where he remained until 1913 when he became superintendent of the Cleveland and Pittsburgh division of the Pennsylvania Lines West of Pittsburgh, with headquarters at Cleveland, O. He remained here until 1915, when he was promoted to general superintendent of the central system and in 1917, he was transferred to the southwest system. In 1920, he was promoted to general manager of the southwest system and in 1925 with the consolidation of the Southwestern and Northwestern regions, he was appointed assistant general manager of the Western region, a position he held until his recent promotion to assistant chief engineer of the system.

I. W. Geer

Mechanical

C. S. Jones, master mechanic of the Peninsula division of the Chicago & North Western, with headquarters at Escanaba, Mich., has been transferred to the Galena division, with headquarters at Chicago, succeeding **Hugh Morris,** deceased. **J. C. Stump,** general foreman at Butler, Wis., will replace Mr. Jones. **W. A. Langlands,** general foreman of the Galena division, with headquarters at Chicago, has been promoted to master mechanic of the Chicago terminal, with the same headquarters, to succeed **W. R. Smith,** deceased.

W. H. Flynn, superintendent of motive power of the New York Central, with headquarters in New York, has been appointed general superintendent of motive power, with the same headquarters. **R. M. Brown,** assistant superintendent of motive power, with headquarters in New York, has been appointed superintendent of motive power, with the same headquarters. **M. W. Hassett,** general master mechanic, with headquarters at Buffalo, N. Y., has been appointed assistant superintendent of motive power, with headquarters in New York.

Purchases and Stores

R. J. Elliott, purchasing agent of the Northern Pacific, with headquarters at St. Paul, Minn., has been promoted to director of purchases, with the same headquarters, and will be succeeded by **C. C. Kyle,** general storekeeper, with headquarters at St. Paul.

Hal G. Foster, traveling storekeeper of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been transferred to the staff of the vice-president, with the same headquarters, and will be succeeded by **C. J. Mackie,** storekeeper at Aurora, Ill. Mr. Mackie will be replaced by **G. A. Goerner,** storekeeper at Denver, Colo., who will in turn be replaced by **C. E. Swanson,** acting storekeeper at Casper, Wyo.

Obituary

Robert F. Moffett, general car inspector of the Gulf Coast Lines, died at his home in Houston, Tex., on September 16.

William O. Cook, who retired as a master mechanic on the Denver & Rio Grande Western, in 1925, died on September 18, at Denver, Colo.

Desmond Fitzgerald, former president of the American Society of Civil Engineers, died at his home in Brookline, Mass., on September 22.

Arthur G. Wild, trainmaster of the Coast lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., died after a short illness, on August 9, at Los Angeles.

Cromwell Tucker, who retired as freight claim agent of the Denver & Rio Grande and the Rio Grande Southern, in 1918, following a stroke of paralysis, died at his home in Denver, Colo., on September 16.

Henry McL. Harding, consulting terminal engineer, died of apoplexy at his home in New York, on August 24. Mr. Harding, who was born at Bath, Me., in 1851, and graduated from Yale University in 1875, had been all his life closely identified with transportation developments as consulting engineer on port and rail terminals on waterways. He served as a member of the Port and Terminals committee of the United States Shipping Board during the war, and was first president of the Society of Terminal Engineers. He was a pioneer in the development of street railway systems in New England and the middle west.

THE ENGINEMEN'S SCHOOL OF INSTRUCTION on the Wabash will be extended to its subsidiary, the Ann Arbor, in the near future. The school instructs firemen in the economical handling of fuel and enginemen in train handling.

Railway Age
Motor Transport Section
Devoted to the Co-ordination of Railway and Highway Service

Vol. 81, No. 13 September 25, 1926

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The Motor Transport Section

WITH this issue of the *Railway Age* begins the publication of its Motor Transport Section as a separately bound supplement of greatly increased size and scope. This section will be a part of the fourth issue of the *Railway Age* each month, and will go to all *Railway Age* subscribers. Subscribers who wish to do so may secure the fourth issue of the *Railway Age* each month only, including the Motor Transport Section, at a subscription rate of $1 a year.

The Motor Transport Section will contain in each issue editorial material of these types: Editorials on matters of interest particularly to railroad motor transport officers; articles describing the use being made by an increasing number of railways of motor buses and trucks, and how, where and why such use is being made; articles describing in adequate detail the practices and methods adopted by individual railways in operating and maintaining their buses and trucks; articles describing trends and new developments in legislation, taxation and government regulation affecting motor vehicle carrier operation; descriptions of new devices developed by the manufacturers of automotive equipment in the interest of more efficient and economical bus and truck operation and maintenance; and news of developments in the railroad motor transport field, such as the activities of the association of railroad motor transport officers, changes in official personnel of railroad bus and truck operating subsidiaries, inquiries and orders for new bus and truck equipment, etc.

The *Railway Age* has two purposes in increasing the size and scope of its Motor Transport Section and in publishing it as a separately bound supplement. One is to give *Railway Age* readers more information, and more detailed information, regarding motor transport practices and possibilities than would be possible in a small section of the paper. Evidence of the desire for such information was afforded by the enthusiastic reception which was accorded the suggestion that railroad officers organize to facilitate the exchange of information on railroad bus and truck operation. Railroad operation of motor vehicles is still new. Comparatively few have the knowledge, gained by experience, of how such operation can be carried on efficiently, economically and profitably. Others planning entrance into the motor transport field require such knowledge. It would be wasteful of time and money if each railway were to have to learn entirely from its own experience. Hence, the organization of the Railroad Motor Transport Conference. A purpose of the Motor Transport Section will be to help to make railroad bus and truck operation successful by affording a clearing house for experience and ideas. With the co-operation of the railways, which has always been forthcoming, the Motor Transport Section will make available to all the knowledge of each about the operation and maintenance of the motor bus and truck, and news and other developments affecting it, that railroad officers, interested either directly or indirectly in motor transport, will want.

Secondly, officers supervising railroad bus and truck operations, a number of whom have come into the railway fraternity from independent bus and truck companies, will need more detailed information and comment regarding bus and truck operation and maintenance as carried on by the railways than the *Railway Age* proper, out of consideration for the interests of the bulk of its readers, could fairly publish in its regular columns. It is believed that the publication of the Motor Transport Section as a part of the *Railway Age*, but physically divorced from it and available separately, will meet all the requirements of all those concerned with railway bus and truck operation and maintenance.

Many railroads which avail themselves of highway motor vehicles do so, not by operating these vehicles themselves or through subsidiary corporations, but by contract with independent operators. The Motor Transport Section will deal with the relationships between the railroads and these contractors and, when time has brought a richer experience upon which to base mature judgment, will discuss the various situations making for a preference of direct operation over contract operation and vice versa.

Problems of organization and personnel are, since automotive common carriers are so new, at present in a state of flux. Much study and discussion will have to be given them before satisfactory solutions are reached and the *Railway Age* Motor Transport Section will deal adequately with these problems.

The Motor Transport Section is published as a necessary part of the service of the *Railway* Age to the transportation industry, and it is sincerely hoped that it will be of value to the railways and their officers in this period of great change in transportation methods. Comments and suggestions regarding its contents will be gratefully received.

The Bus Exhibit at the A.E.R.A. Convention

THE most complete exhibit of motor buses and bus equipment ever assembled will be on view in connection with the convention of the American Electric Railway Association at Cleveland, Ohio, on October 4-8. Railway officers who are interested in the bus from the standpoint of users, or prospective users, will find much of interest at this exhibit. Many of them had the opportunity to view and study the highway carriers at the conventions at Atlantic City last June, when a number of the bus and truck manufacturers displayed their products in the motor transport exhibit. The show at Cleveland, however, will be much more comprehensive, since virtually all the bus equipment manufacturers will be repsented there. The motor bus is so new, comparatively, that railway officers in general have only a casual knowledge of its characteristics. As operators of buses, they will need a more thorough knowledge of them. A visit to the Cleveland exhibition will provide a good opportunity for securing such knowledge. A large number of steam railway officers are expected there.

Better Freight Handling Through the Use of Trucks

SIX benefits obtained through the substitution of motor trucks for local freight trains in the transportation of l.c.l. freight are acknowledged by the Pennsylvania, whose truck operations are described in this issue. They are greater efficiency and economy in operation; clearing the rails of the slowest moving freight traffic, thus increasing their capacity for other movements; elimination of crossover movements required by local freight trains to reach stations on both sides of the track, which also helps to speed up other trains; reduction of 50 per cent in loss and damage claims due to less complicated handling; increased business and greater satisfaction of patrons, due to faster handling of l.c.l. freight; and cheaper and faster interchange of freight in terminal districts. These are strong arguments in favor of the use of trucks in the replacement of certain trains. The handling of l.c.l. freight over short distances has always been a costly operation, in money, time and facilities, when carried out solely by rail. The Pennsylvania has found that the adoption of trucks has served not only to reduce the cost of handling such business, but has always brought it new business by reason of the faster service it can provide with the trucks. The adoption of the motor truck by the railways, like the adoption of the motor bus, is a step toward the modernization of their facilities for furnishing transportation.

The Railroad Motor Transport Conference

THE Railroad Motor Transport Conference at Providence and Boston on August 26 and 27, in the words of one of those in attendance who is a veteran as far as railroad conventions are concerned, set a high standard of earnestness, hard work and achievement. Not only the committees and the hosts, but the rank and file of delegates themselves really worked from the time they arrived in Providence until they left Boston. There was much to see and much to learn. The hosts, the New Haven and the Boston & Maine, have had the highway problem before them as acutely, if not more so, as most other railroads. They have grappled with it. They have, at least partially, solved it. Naturally they have a lot of experience at their disposal which would be of value to the other roads of the country. And they gave it, without stint. When the officers who were describing the various phases of work had finished their accounts, they submitted to questioning. And the questions were as earnest and to the point as the original expositions. We have yet to hear of anyone who attended who would not admit great profit from the experience. The highway motor transport problem is with the railroads, and it is with them to stay—for some time at least. It follows, therefore, as with most problems, that the man who knows most about the matter can best grapple with it. This is the opportunity which the Motor Transport Conference offers, viz., to learn some of the real facts about motor transport, whether one's own railroad is actually engaging in it or not. The new England meeting set a high standard for the Chicago meeting, scheduled for December, to hold before it. The Conference in New England proved what can be done. The Chicago meeting should continue along the same lines—and by reason of the good work which the conference has done, it deserves at its Chicago meeting a wider attendance than that which it had in Providence and Boston.

Efficient Maintenance Keeps Buses Earning Money

A MOTOR bus on the road is a producer of revenue, but one waiting in the shop for repairs is not only not a producer, but is a spender, since the interest on the investment in it keeps mounting right along. For this reason, and for the additional reason that few companies have an adequate surplus of equipment to permit of very many buses being laid up for repairs without substantially handicapping the operating department, prompt and efficient maintenance of buses exercises a profound effect upon net earnings. Efficient maintenance of buses depends upon many things, just as does efficient maintenance of railway equipment. It depends upon well designed garages and shops, erected especially for bus repairs. Up to a certain point, it is possible to adapt railway shops to the making of bus repairs, but at best this is a make-shift which will tend to break down as railway bus operations expand and equipment multiplies. Efficient maintenance depends on a skilled force of mechanics, a force devoted solely to automotive repair work. A railway mechanic may be made into a bus mechanic, but he is not one unless he is especially schooled in the new work. It depends upon a well-planned assignment of the various kinds of repair work, running repairs, painting, carpentry, rebuilding, and so on, to specified sections of the garage and shop and to designated groups of employees working only on one class of repairs. It depends upon an adequate supply of parts of all kinds in the stockroom. It depends upon the number and kinds of tools which these employees are furnished, from lathes and punches to grease machines and wrenches. It depends finally upon a scheduling of repair work which will put disabled buses back on the road and earning money with the least possible loss of time. The maintenance facilities and methods of the Northland Transportation Company, the bus subsidiary of the Great Northern, are described in this issue. They represent bus maintenance that is efficient.

The Bus Has Many Uses in Railroad Service

THE Baltimore & Ohio's motor coach train connection service in New York is said to be living up to expectations and bidding fair to exceed predictions. This is important news, but the situation is one which can probably be judged accurately some months from now rather better than at the present time. The experiment is important because, if successful, it suggests opportunities to railroads for solving an important passenger traffic problem not only in New York and the United States but at many points all over the world. Already the B. & O.'s plan is beginning to attract attention in Europe and, we venture to predict, we shall soon have concrete evidence of interest aroused in more remote parts of the globe. As a matter of fact, the example has already been emulated to a slight extent by another road in this country, which is planning service with the cooperation of an independent bus operator to give train connections to an important city by two trains which have not in the past served it. The bus is now being used by the railroads in several different fields, some of which are: To supplant unremunerative trains, to supplement trains and bring business to them, to eliminate local stops by trains, to extend service beyond the rail line, to give an optional service along the same line as served by railroad, to replace shop trains for employees, and last, to improve train service to patrons by making the stations more easily accessible. The bus seems to be proving an adaptable tool in the hands of railroad men.

A Growing Resentment Against Hogging the Road

A GROWING resentment against the practice of nine motor buses out of ten of "hogging the road" without regard to the safety and rights of other highway travelers is a serious problem which railway operators of buses, both present and future, must face squarely. Public opinion is a factor of supreme importance to enterprises whose most valuable asset is public good will, and transportation companies, both railway and highway, are in this category. Up to a few months ago the resentment against the discourtesy, to use a mild word, of most motor buses, when proceeding over the streets and highways, was noticed only occasionally. It was too scattered to amount to a well-formed public opinion. But today such resentment has become a definite state of mind in an increasingly large proportion of the public. It is reflected in more and more frequent newspaper editorials decrying the disregard of the buses for others who have an equal right to use the highways in safety and comfort. It is reflected in the revoking of privileges formerly granted the buses, such as the exclusive right to use certain sections of parking space in towns and cities as points for the picking up and discharging of passengers. It will be more strongly reflected in the future in more serious measures if public opinion against motor bus "road hogs" continues to grow. To the credit of railway bus operators and other responsible and well managed highway carriers, it can be said that their buses are not as a rule the serious offenders, but they will pay the penalty along with the rest for the offenses of even the few if continued. The sooner buses show courtesy to others on the road, as well as to their passengers, the better will be their chances to continue to enjoy the privileges accorded them by the public.

Letters to the Editor

Favors Railroad Operation of Buses and Trucks

READING, PA.

TO THE EDITOR:

The several years' experience I have obtained as an operator of both motor buses and motor trucks in work of a common carrier nature has proven to me that all such work should be handled directly by the railroads or in connection with their operations, for the best interest of the public. At the hearing before the Interstate Commerce Commission held in New York City on September 10, I as a motor truck operator, so stated, giving as my reasons, in brief form, the following:

All public utility work, of whatever nature, can be handled in an efficient manner only if such restrictions are placed on competition as to enable the work to be performed in an efficient, economic manner and with strict regulation as to rates and operation, with due protection against unfair competition. In any city or rural locality it would be impractical, and the cost would be prohibitive, if laws permitted unlimited operation of electric companies, telephone companies, gas companies and water companies. In any work of such nature it has been found necessary to protect existing companies in given territories, to permit them to serve the general public in an efficient and economic manner.

What is true of the control exercised over the above utility companies is true, and to a greater extent, of the service rendered by the motor trucks and motor buses. With the congested territories of all business centers of cities and industrial centers it is fast becoming a problem to handle the motor traffic.

However, whether the railroads own these lines or individuals, the rates should be set by a federal body; they should be uniform to all, and the habit of quoting special rates to fill a truck, return loads, etc., should be denied, the same as it has been denied to the railroads. Such methods are unfair to the public, and to the business. The quoting of a low rate by one firm merely to make up a return load, and then to have another firm quote a standard rate, creates a very bad impression on shippers; that is largely why the motor trucking companies engaged in express work are not respected or their business ethics admired. In all cases such rates should be much higher than for railroad freight; it is express service.

The motor-bus field likewise should belong to the railroads. To have individual operators take even a small portion of the passenger trade from the roads makes the passenger service a burden. It, however, must be maintained, and if discontinued, its place could not be filled by the bus. In the experience I have had in the bus work, having owned two lines, in rural and suburban territory, I have found such operations are not profitable, and can only be of profit and benefit as a feeder to a railroad.

America can trust its future transportation to the present transportation managements and know that it will be served efficiently, economically and for the best interests of all. To so called "big business" America owes its progress and present prosperity.

JOHN R. BINGAMAN,
President, Bingaman Motor Express Co., Inc.

Motor Transport Conference Meets

Interesting three-day meeting, attended by **50** *officers representing* **28** *railways*

THE first regular meeting of the Railroad Motor Transport Conference was held at Providence, R. I., and Boston, Mass., on August 26 and 27. The conference, which was notable for the close attention given to the program by the delegates, was attended by 50 officers representing 28 railways.

Following registration on August 26, the morning session was called to order by A. P. Russell, president of the New England Transportation Company and vice-president of the New York, New Haven & Hartford, who had been chosen as temporary chairman by the organization committee. After the report of this committee had been presented, officers of the New England Transportation Company described different phases of their operations.

Mr. Russell spoke on the Theory of Railroad Highway Operation, which covered the conditions which had led the New Haven to form its motor bus subsidiary and the degree of success achieved since its organization in September, 1925. The New England Transportation Company is now operating 168 motor coaches over 1,300 miles of route, according to Mr. Russell.

Public Brought to Understand Railroad's Problem

F. C. Coley, passenger traffic manager of the New York, New Haven & Hartford, spoke on the Method of Making a Railroad Passenger Survey, Its Cause, Purpose and Results. Mr. Coley stated that the question to be considered was wholly economic and that the cause was the use of the automobile. The New Haven, he said, attended all commission and local hearings in its territory where independents were seeking bus permits and, where railroad service was found to be inadequate, arranged to put on additional train service. However, it was found that the demand for a type of service which could be given by the bus was so insistent that improving train service was not enough to meet this demand. Moreover, it was seen that adding more trains could not go on indefinitely. The railroad passenger traffic showed a constant tendency to decline in spite of the efforts made in improving rail service.

It was decided that it would be necessary to curtail train service where it was found to be unprofitable. At first there were many protests on the part of various towns regarding the railroad's proposal to reduce service but by constant honest discussion with them on the problem involved the people gradually came around to the idea that the company could not reasonably be expected to provide trains where there were no passengers for them. Working with the communities brought the people to an understanding of the railroad's problem and secured a sympathetic attitude on their part when it was found necessary to reduce train service or substitute bus service for it.

Varied Disposition of Mail and Express Business When Train Service Reduced

Harold Price, traffic manager of the New England Transportation Company, discussed the Method of Making a Highway Traffic Survey. Mr. Price explained that the road had two classes of bus service, i.e., that designed to supplant rail service and that designed to supplement rail service. The transportation company already had figures of prospective business from the railroad figures in the case of supplanting service. In the case of supplementary service, however, more studies of possible traffic were necessary.

Then, he said, there was the question of handling mail and express. He said that as far as the mail was concerned, the parcel post business caused the greatest difficulty, because it was frequently of too great bulk to

Three Tractors with Trailers Operated by Stone's Express, Inc., the B. & M.'s Freight Contractor

be handled in a bus. Express service, where no longer offered on the railroad, was either abandoned, handled by the express company itself or handled by the New England Transportation Company by truck, whichever solution seemed the most expedient in a given case.

J. O. Halliday, manager of transportation on the New York, New Haven & Hartford, spoke on co-ordinated service, including the use of rail motor cars. Mr. Halliday explained that express business was handled on the railroads where passenger train service was abandoned for bus operation. The mail business, he said, generally went to a bus or "star" route; occasionally a truck was put on to handle it. The company, he said, had 30 rail cars in service covering 75,000 miles per annum which have reduced the expenses of rail operation and the buses have brought material saving in train service expense.

He dwelt on the improved service which was possible by substituting bus service for local stops on trains thereby making train service—with bus connections—much quicker. The elimination of local stops, having the bus do the local work and connect with trains at important points, has, he said, increased the revenue of the trains.

Operating Motor Coaches on the Highways

F. S. Hobbs, manager of the New England Transportation Company, spoke on the highway operating problem. He pointed out that the company was operating 168 buses on 39 different routes, in addition to agreements it had with allied companies. Twenty-seven of the buses, he said, were of the semi-deluxe type and the remainder de luxe. The company was, he said, operating 438,000 bus miles per month. There were 650 schedules operated per day, including double heading.

He dwelt on the varying operating costs on the various routes by reason of the varying typography and local conditions. The longest route, he said, was 60 miles, the shortest, three miles and the average, 28 miles.

Employees were governed, he said, by a well worked out rule book, adherence to which secured performances of a uniformly high character.

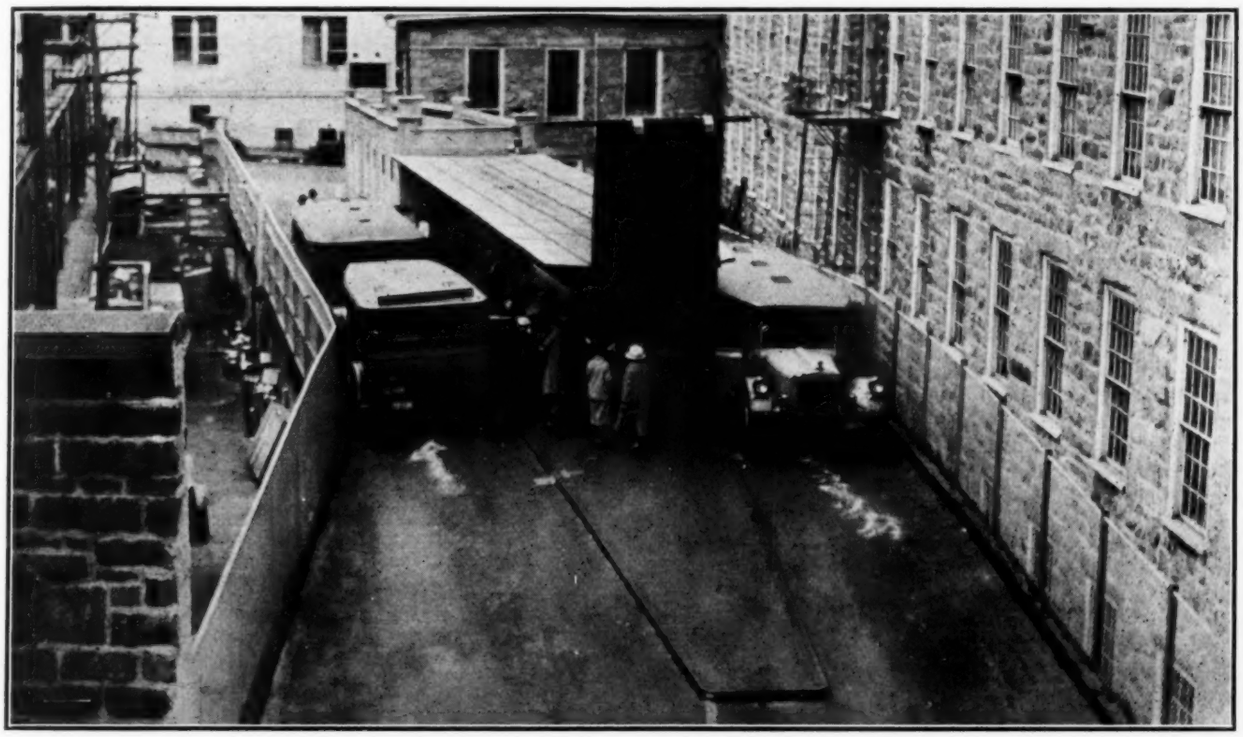
The company, he said, aimed to give "safe, courteous, efficient service." Drivers were not allowed to exceed 30 miles per hour and were expected to observe all the rules of the road and not make themselves unpopular with drivers of other vehicles by crowding smaller units off the road.

He expressed the belief that "riding on rubber" would continue to grow and said he believed the old established carriers should give the people the kind of service which they really desired to use.

The Motor Vehicle Stores Problem

D. V. Gearwar, purchasing agent of the New England Transportation Company, gave some details regarding the working of his department. In the automotive field, he said, it was necessary to spend a slightly higher percentage of gross earnings for material and supplies than on the railroad. The company, he said, was using from 75,000 to 80,000 gallons of gasoline and 8,200 quarts of oil a month. General stores for the company are located at Providence and substocks at other points. Substocks, he said, were carried "automatically" by the general stores at Providence.

Intensifying of securing sufficient stores activity, he said, has enabled the company never to have a coach out of service more than 24 hours. There was a turnover in stores in 60 days, he said. Stores were kept open 24 hours a day.



N. E. T. Bus Terminal on Private Property at Fall River, Mass.

The N. E. T.'s Accounting System

R. H. Palmer, auditor of the New England Transportation Company, spoke on accounting problems. He

called attention to the difficulty that was experienced in getting non-railroad men, who had never had experience with standard railroad accounts to see the importance of conforming to the system laid out. There had been trouble also, he said, in getting creditors to render bills on time but this condition was improving (a brief description of the N. E. T.'s accounting system, along the same lines as described by Mr. Palmer at Providence, appeared in the *Railway Age* of June 26, page 1984.)

Maintaining the Buses

F. J. Swentzel, mechanical superintendent of the New England Transportation Company, discussed the maintenance problem. He emphasized the importance of selecting good equipment in the first place and that of a type to meet the varying characteristics of the country. He suggested the advisability of having an inspector to inspect the buses while they were being built to assure their conformance with specifications and also to make them comply with the somewhat wide variations demanded by various state laws.

Operators, he said, should be placed in a school under a capable mechanical instructor, not to make mechanics out of them but to teach them the fundamentals so that they would at least recognize when something was wrong. He advocated standardizing on the general design of bodies, not so much from a standpoint of seating, as on size of windows, panels, doors, windshields, etc., to make these elements interchangeable as far as possible. He also recommended standardization on nipples and connections so that two or three power greasing systems would not be necessary in every shop.

Lubrication

He presented some rather detailed figures on lubrication, stating the results of a number of tests. There were many ideas, he said, as to the requirements for changing oil. If the bus was to be kept in an unheated garage or had considerable layover time it ought to be changed every 600 to 750 miles, under more favorable conditions 1,000 to 1,200 miles. There is a difference, he said, in the type of oil required. An oil which would be good for a certain make of car on the Boston-Providence run would not necessarily be a good one for the same bus working in the vicinity of Chicago. At the present time, he said, the company was using several different grades of oil. Universals, he believed, needed attention every 1,000 miles. Wheels, steering gear housing, transmission and rear axle housing every 5,000 miles.

When cars come in, they are oiled and gassed and then turned over to the mechanical department for inspection by the driver who is required to make out a defect card calling attention to any defects which he has noted. Each car is given an inspection every night.

The batteries in the cars are all overloaded, he said, and hence have to be overcharged. There is, he said, a need for greater standardization in batteries. The New England has to have eleven different types and sizes.

The mechanical department, he said, has a competent mechanic with ability as a "trouble shooter" at each terminal to make light adjustments, conferring with the driver when the cars come in. During the Memorial Day holidays, he said that these men took care of 39 minor matters which would probably have brought failures on the road.

The Legal Side

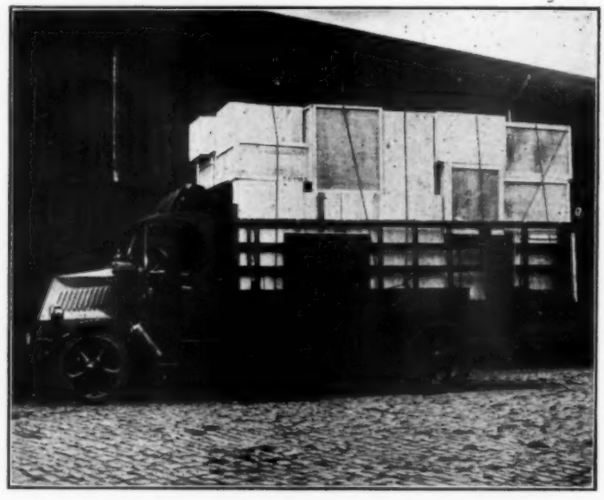
E. J. Phillips, vice-president of the New England Transportation Company, discussed the legal aspects of the highway problem. He explained that from 1922 to 1925 it was impossible legally for the steam roads in Rhode Island, Connecticut and Massachusetts to put on bus service but that this law was changed in 1925. He stated that the Public Utility Commissions have taken the position that if there is a demand for bus service parallel with steam or electric lines, these lines should be allowed to put it on rather than an independent, if they desired to do so.

One of the advantages of a subsidiary company to handle the highway business, he said, was to make the highway company stand on its own feet rather than burden the railway company with it.

Conference Rules

At the evening session on August 26, the proposed conference rules were discussed and adopted. The rules follow:

1. An organization to be known as the Railroad Motor Transport Conference, composed of railroad officers interested in the development of motor transportation by railroads, whether passenger or freight, formed for the purchase of establishing a clearing house for transportation thought and development of this character; and for studying the problem raised by highway competition generally and specifically in order to determine the facts and fundamental principles involved, including the several methods developed for meeting this form of competition for the guidance of individual carriers in handling their local problems; and to accomplish this purpose the studies and reports of the conference shall be made and rendered on such territory with its specific problems and its methods for meeting them as the needs or desires of the member carriers shall indicate.



A B. & M. Transportation Company Freight Truck

2. Any Class 1 railroad of the United States or Canada is entitled to membership in the conference and may be represented by as many of its officers as it sees fit to designate. Any highway subsidiary of these railroads is entitled to membership on the same terms.

3. The officers of the conference shall be a chairman, three vice-chairmen, a treasurer and a secretary.

4. Sub-committees will be formed for the study of:
   a. Application of the motor coach to the use of steam railroads;
   b. Application of the motor truck to the use of steam railroads;
   c. Application of the rail-motor car to the use of steam railroads.

There will be a law committee with such duties as the chairman may prescribe.

The executive committee of the conference will consist of the officers named above and of seven representatives of member roads who will be elected by the conference. Each of these will represent two adjoining sections of the United States. as established by the Car Service Section of the A. R. A. for the creation of the Shippers' Advisory Boards.

5. The studies and reports submitted to the conference by the

several committees will be distributed to the member carriers by the secretary.

These rules are to continue in effect until the first annual meeting of the conference in Chicago, during the first week in December, and the officers elected under them are to serve until that meeting. During this interval the railroads of the country will be asked to determine upon their further participation in the conference and their opinion as to the desirability of its permanent organization.

The following temporary officers were elected:

Chairman, A. P. Russell, president of the New England Transportation Company.

Vice-chairmen: T. B. Wilson, supervisor of transportation, Southern Pacific, in charge of the section devoted to the study of the application of the motor coach to the use of steam railroads; G. C. Woodruff, assistant freight traffic manager, New York Central, in charge of the section devoted to the study of the application of the motor truck to the use of steam railroads; N. D. Ballantine, assistant to the president, Seaboard Air Line, in charge of the section devoted to the study of the application of the rail-motor car to the use of steam railroads.

Secretary and treasurer, F. J. Scarr, supervisor motor service, Pennsylvania.

The executive committee consists of: H. F. Fritch, passenger traffic manager, Boston & Maine, and president, Boston & Maine Transportation Company; W. L. Campbell, assistant to the vice-president, Erie; J. G. Drew, vice-president, Missouri Pacific; A. Hatton, general superintendent of transportation, Canadian Pacific; C. S. Lake, assistant to the president, Chesapeake & Ohio; G. W. Lupton, assistant to the vice-president, Atchison, Topeka & Santa Fe; and R. N. VanDoren, vice-president and general counsel, Chicago & North Western.

The executive committee was instructed to communicate with officers of the American Railway Association to the end that affiliation with that body may be brought about.

Practical Studies

The sessions on August 27 were devoted to the practical side of the highway development, the delegates being given an opportunity to inspect the accounting methods of the New England Transportation Company, the bus terminal at Providence, and the garage and repair shops there.

After luncheon, the delegates were taken to Boston by New England Transportation Company motor coaches to study the use of trucks by the Boston & Maine in that city.

Returning to the North Station, F. I. Hardy, treasurer of the B. & M. Transportation Company, discussed the studies made by the Boston & Maine preceding their use of trucks, and explained the kinds of freight service which the Boston & Maine Transportation Company is rendering by truck. The over-the-road service, store-door delivery in Boston, Lowell and Lawrence, and the intra-terminal transfer in Boston.

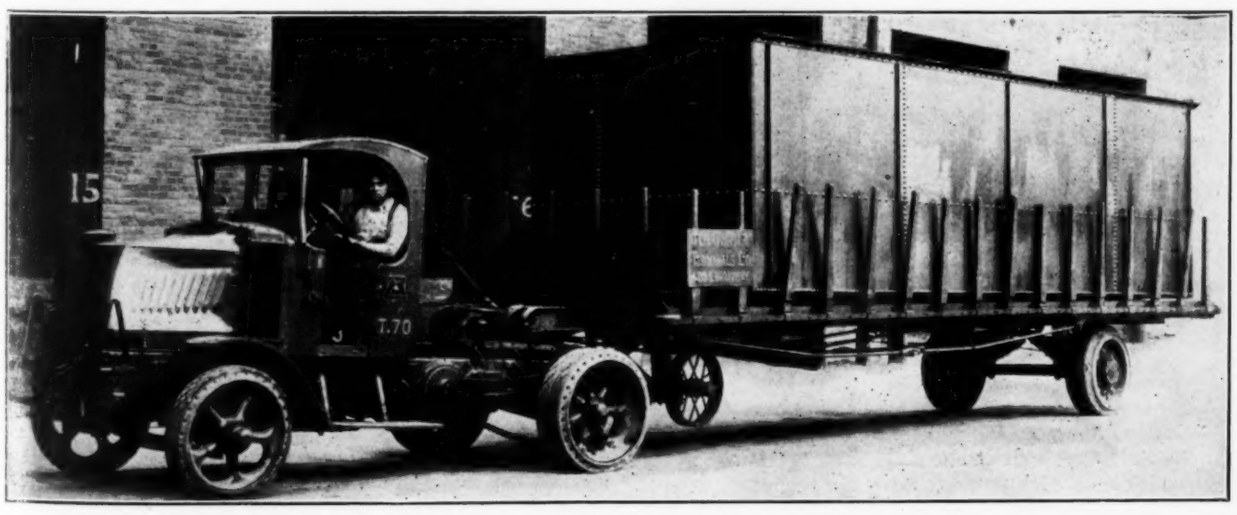
At the evening session, V. F. Letcher, special officer to the Victorian Railways Commissioners of Melbourne, Australia, discussed the operation of motor vehicles by the Victorian Railways of Australia. Following Mr. Letcher, W. L. Campbell, of the Erie, told of his company's use of motor trucks in New York; and M. F. Steinberger, special engineer on the staff of the operating vice-president of the Baltimore & Ohio, described the motor coach service installed by that company between Jersey City, N. J., and New York, and between Newark, N. J., and Elizabeth. Following the evening session the conference was adjourned.

Tractors and Trailers Meet Test in Terminal Service

By H. W. Raymond
Sales Manager, Lapeer Trailer Corporation

IN St. Louis and East St. Louis, it has been customary during the past several years for the railroads centering on those terminal points to close their inbound and outbound freight depots for the receipt or delivery of merchandise on Washington's birthday, February 22. At the same time, about 75 per cent of the large shippers in the two cities (which are separated by the Mississippi river) do not close.

As a result of these customs, the morning of February 23, dawns annually on a situation of two-fold congestion. The railroad yards are filled with cars which arrived before February 22. The shipping rooms of the St. Louis and East St. Louis shippers, on the other hand, are piled high with freight which accumulated during the holiday. Forces are thus massed on two sides ready



Loads of All Sizes Are Carried

to fall on the transportation system of the Columbia Terminals Company just as soon as the wheels of business begin to turn on the morning of February 23.

From the point of view of the commercial hauler, wherever he may be, who has transportation problems to solve, the St. Louis situation is an interesting and instructive object lesson. In the first place almost all of the Columbia Terminals Company hauling is done by semi-trailer-tractor installations. In the second place the holiday closings of the railroad freight depots bring about a severe test—a test which this year was more severe than ever before. On February 23 an arbitrary peak was thrust suddenly into the operation chart graph. It had to be absorbed by the regular, normal equipment.

This year, the railroad found itself with 702 cars which had to be released as soon as possible. Inbound freight alone was one-third more than usual. Yet at noon of February 24 all the cars had been released.

Method of Operation

In order to understand the performance record of the company's equipment, it is necessary to have a clear picture of the method of handling the intra-city and inter-terminal hauling. The equipment consists of nine-ton Lapeer semi-trailers and tractors, each combination carrying an average load of 12,000 lb. One of the features of the trailer-tractor method is its flexibility.

The Columbia Terminals Company operates eight off-track depots in St. Louis and East St. Louis which are located at points convenient to shippers. These facilities, being off-track, relieve congestion and facilitate the receipt and delivery of shipments at on-track railroad stations. If the railroads had to buy the right-of-way to these off-track terminals the cost would be tremendous, assuming they could be obtained. Inbound freight is

The Trailers Are Varied in Size

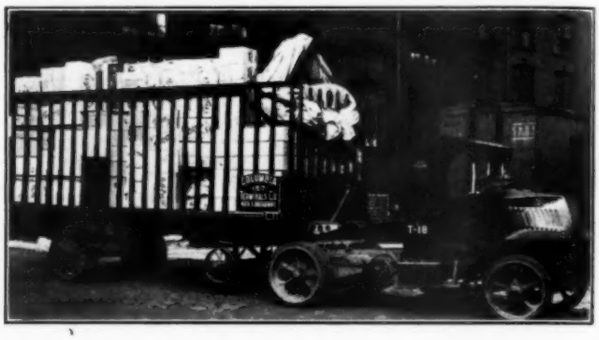
taken off the cars at on-track railroad depots and run directly on waiting semi-trailers, without duplicate handling.

When the trailers have been loaded they are pulled away by the tractors—either to another railroad depot or to the off-track terminal most convenient to the consignee. In the latter case, the consignee calls for his freight at the terminal. The value of this system is especially clear in times of strain. Every saving in space, time, handling, or number of trips counts two-fold.

Outbound freight goes through a similar process. It is delivered to a convenient off-track terminal by the shipper where it is reassigned on trailers for the proper railroad depot and delivered by the company. Here again the economies in space and time are apparent. Handling is sometimes reduced to the minimum by loading the trailers direct from the shipper's vehicle which draws up alongside.

The ratio of trailers to tractors is one of the most important factors in this system. Ordinarily each tractor works with three trailers. One trailer is in process of loading or unloading at each end of the haul while a third is in transit. The only deviation from this rule comes when freight is outbound for the reason that it has to be checked and properly receipted for at the depot.

Under the strain period of February 23 and 24, 1926, the system continued to work as on normal days. The movements of every tractor were known every minute



Mack Tractor and Lapeer Trailer of Columbia Terminals Company

of the day by the chief dispatcher. When freight demands grew heavy in one section and light in another a free tractor was sent at once to the scene of activity. The whole system is flexible in this respect. Motors are not located with the carrier necessarily, but rather where they are most needed. In this way the whole job can be nicely balanced at all times. Power is ready where it is needed and when it is needed. Carriers are spotted where the demand appears. In this way waste in time, labor and effort is reduced to the minimum, and results are apparent in better service.

WITH THE COMPLETION of plans that are now being put into effect the passenger train service of the Atlantic Coast Line to Charleston, S. C., will be materially improved and passengers to and from that city will be able to use, during the tourist season, the road's "Florida Special" and "Gulf Coast Limited," which have not heretofore been available to them. As is well known, Charleston occupies a narrow strip of land between the Ashley and Cooper rivers. The main double track line of the Atlantic Coast Line crosses this peninsula some 6 miles north of Charleston. From Ashley Junction a double track line extends to Charleston yards and Union stations. It is necessary for all passenger trains to use a wye in entering or leaving the station.

The location of the city with respect to the main line tracks of the A. C. L. involves a loss of approximately 50 minutes for trains of that system to enter the city proper. In the past the fast trains mentioned above have been operated via Ashley Junction and have not come into Charleston. The traffic to and from the city have, however, made it desirable to provide additional passenger train service and this is planned.

Just north of Ashley Junction a new passenger station to be known as North Charleston is now being erected. In the future the "Florida Special" and the "Gulf Coast Limited," will stop at this station to take on and discharge passengers from and to Charleston. The distance from the city is short and a paved road enables the trip to be made easily and quickly by automobile. Bus service will be provided connecting with the city by a private operator.

I. C. C. Motor Transport Investigation Nearly Concluded

Final hearing at Washington on October 25 will close nation-wide investigation

THE Interstate Commerce Commission investigation, No. 18,300, which began in Chicago on July 27, is now nearly concluded. The investigation, "into and concerning the operation of motor buses and motor trucks by or in connection or in competition with common carriers subject to the Interstate Commerce Act," will be concluded with the final hearing at Washington, D. C., on October 25.

Replies to the commission's questionnaire, which was sent to steam and electric railways, were to be returned prior to September 20. The earlier replies received indicated that the railways were making a sincere effort to aid the commission in its investigation by making their replies complete in every detail.

Western Railways Present Little Testimony

In general, the western railways showed a disposition to depend upon their replies to the commission's questionnaire to present their case and did not testify either briefly or at length at the various hearings. There were certain exceptions, however, notably the Chicago, Burlington & Quincy and the Chicago & Alton at Chicago, and the Denver & Rio Grande Western and the Colorado & Southern at Denver, Colo.

The eastern lines showed a disposition to participate more actively in the hearings. The Boston & Maine, the New York, New Haven & Hartford, the Reading, and the Erie were represented at Boston, Mass., and New York, by witnesses who described in detail their losses in passengers and freight to competitive bus and truck lines and their efforts to meet this competition by extending their service to include highway operation.

Railway Traffic Losses

The deep inroads made by highway competition, particularly in their passenger revenues, but also in their freight revenues, were described by a number of railway witnesses. At the Denver hearing F. A. Wadleigh, passenger traffic manager of the Denver & Rio Grande Western, cited the decline in passenger revenues of his company in the state of Colorado from $3,146,000 in 1920, to $1,732,000 in 1925. B. W. Robbins, general freight agent of the same railway, testified that for the 12 months ending February 28, 1921, the less-than-carload freight shipments handled between Denver and Trinidad aggregated 19,967 tons, the revenue derived from this business being $191,035. Similar shipments handled by the D. & R.G.W., during the 12 months ending February 28, 1926, aggregated 13,110 tons, with a revenue of $139,425. The loss he attributed to the competition of truck lines operating in this district.

J. E. Buckingham said that on the Denver-Ft. Collins line, of the Colorado & Southern, there had been a decrease in the number of passengers handled in 1925, as compared with 1920, of 708,161, passenger revenues declining $1,436,869.

Howard F. Fritch, passenger traffic manager of the Boston & Maine, testified at the Boston hearing that the Boston & Maine had lost 44,585 passengers—almost one-fifth—between Boston and Nashua, N. H., and between Boston and Manchester, N. H., in the year from September, 1924, to September, 1925. This represented an annual loss in revenue of $78,500.

F. C. Coley, passenger traffic manager of the New York, New Haven & Hartford, estimated its revenue loss from bus competition at $3,327,852 and the total loss of revenue to private automobiles and buses at $27,889,287.

At the New York hearing J. K. Thompson, assistant controller of the Erie, said that the effect of motor bus competition on its passenger service in the northern New Jersey-New York zone was a loss of $1,000,000 a year in revenue. Total passenger revenues have shown a decline of $750,553 for the first eight months in 1926, as compared with the first eight months of 1925.

Railways Describe Own Bus Operations

A number of the railways now operating buses described the extent of their operations at the hearings. At the Chicago hearing the Chicago & Alton testified regarding its proposal to operate two bus lines paralleling its tracks in Illinois. At Denver, the Denver & Rio Grande Western told of its acquisition of two competitive bus lines and their present operations, supplementing the service provided by the company's trains.

The operations of their bus subsidiaries, the Boston & Maine Transportation Company, and the New England Transportation Company, were described by witnesses for the Boston & Maine and the New Haven, respectively, at Boston. Similarly, E. D. Osterhout, passenger traffic manager of the Reading, told at the New York hearing of the plans of his company for the operation of the Reading Transportation Company, whose applications for certificates to begin service are still pending before the Pennsylvania Public Service Commission.

The electric railways took a much more active part at the commission hearings than did the steam railways. Their testimony was largely along the lines of the effect of bus competition and the steps they had taken to meet it. The figures they presented as to their losses to the bus were striking in that they confirmed definitely the prevalent opinion of the popularity of highway transportation. It was generally admitted that the private automobile has taken more passengers from the railways, both steam and electric, than the motor-bus, but that the bus has been an important factor in passenger revenue losses also.

A number of the electric railways told of their operation of buses. In general they agreed that their bus operations, usually at the same rate of fare as that charged passengers on the electric trains, have been carried on at a loss. The representative of the Chicago, North Shore & Milwaukee at the Chicago hearing, however, summed up the attitude of the electric railways towards such losses when he said that his company felt that the losses were more than made up in the new business which the buses, operating as feeders, brought to the railway trains, and also by the advertising value of bus service.

Bus and Truck Transportation Extolled

Partly as a result of the activities of the representatives in the American Automobile Association and the National Automobile Chamber of Commerce, numerous witnesses representing independent bus and truck companies and shippers' organizations appeared at all the hearings to testify regarding the demand for bus and truck service. In general these witnesses agreed that bus and truck service is needed and is here to stay, these carriers providing a service which the railways cannot provide on their rails. The wide extent of bus and truck lines was strikingly shown.

For example, J. P. Haynes, of the Chicago Association of Commerce, testified at the Chicago hearing that there are 516 teaming and motor trucking companies operating for hire in Chicago, approximately 35 of these operating as common carriers between Chicago and various points in Illinois, Indiana, Ohio, Michigan, Iowa, Wisconsin and Missouri, which maintain established routes with more or less regular service and rates. Mr. Haynes told of one Chicago shipper who shipped 511,594 lb. of freight by truck from January 1, to July 1, 1926. Fifteen different companies participated in the movement of this traffic, the average radius of territory covered being from 50 to 75 miles.

Representatives of the bus and truck and companies themselves, as well as the users of their service, showed the advantages they can offer passengers and shippers. Bus operators testified that they are attracting business from the private automobile with their frequent service and convenient pick-up and discharging points. The truck men pointed to their door-to-door service and their speed and flexibility in handling freight over short distances as the principal advantages they can offer shippers.

No Agreement on Regulation

Considerable disagreement as to the necessity or wisdom of regulation of bus and truck transportation by the Interstate Commerce Commission developed at the various hearings. There was a somewhat general agreement among the witnesses, even bus operators themselves, that the bus should be regulated, perhaps by the Interstate Commerce Commission but preferably by the state commissions, such regulation extending over both interstate and intrastate operation.

With respect to truck operations, however, there was striking disagreement. Some of the admittedly common carrier truck men operating on a large scale favored regulation of all kinds of truck operations, common carrier, contract and so on. On the other hand, truck men operating on a smaller scale, the contract truckers and even the representatives of most of the shippers' organizations, held that truck transportation should not be regulated until it has had a chance to find its place in the transportation scheme. Most of the shippers favored rigid requirements for their protection in case of loss and damage to shipments, but nothing else.

A Typical Attitude

The testimony of W. H. Chandler, chairman of the legislative committee and manager of the traffic bureau of the Merchants Association of New York, at the New York hearing, was typical of that of most representatives of shippers. Mr. Chandler went on record for his association as being opposed to any regulation of motor trucks which might restrict their usefulness to shippers. He said that he did not believe motor trucks should be placed under regulation unless they too are granted the same protection for their revenues as that accorded to the railroads under Section 15a of the Transportation Act.

The last hearing with the exception of the final hearing at Washington, began at Kansas City, Mo., on September 24. Prior to it, hearings had been been held at Asheville, N. C., beginning September 15, and Dallas, Tex., beginning September 20.

The Hearing at Asheville

At Asheville, N. C., on September 15 and 16 railroad representatives, including the American Short Line Railroad Association, presented operating figures to support their contention that federal regulation of motor transportation is desirable.

Bus operators and their associations from North Carolina, South Carolina, Virginia, Georgia, Tennessee and other states affected in the territory as well as corporation commissioners and other regulatory officers from the same states advocated state control of motor transportation. Declaring that bus operation is essentially a local question, the state officers sought to show by the weight of the evidence presented in the form of laws, rulings, resolutions and statistics on operations that there is no reason for the federal government to assume regulation of bus operations.

The railroads maintained that inroads on passenger revenues make it advisable that the Interstate Commerce Commission should have the power to eliminate competition where the business is not sufficient to support both railroad and motor transportation, just as a second railroad would be eliminated and for the same reason.

They pointed out the differences in regulations now existing in several southern states as an example of the confusion that is sure to arise if the matter of regulation is left to the states.

North Carolina has one set of rules, Kentucky another, while Tennessee has none at all and Georgia scarcely any, in the regulation of buses, it was declared by the representatives of the railroads. A. I. Hays, of Bristol, Tenn., was one of the chief witnesses used to carry this point. Representing a bus company of Bristol, he told of the confusion resulting from operations in three states.

Frank Page, chairman of the North Carolina Highway Commission, presented figures to show that only 10 per cent of the passenger traffic of the railroads in this state had been usurped by the buses. It was brought out, as a result of the increasing number of excellent highways in the south, that buses were able to penetrate into territory not heretofore served by a carrier and that it was in such service and not in paralleling the railroad lines that the future of the bus transportation business lay.

This condition, it was brought out, is especially true of the mountainous sections of North and South Carolina, Virginia and Georgia where hard surfaced roads have penetrated sections not heretofore furnished with suitable outlets.

THE SOUTH AFRICAN RAILWAYS and Harbors administration is using motor buses as feeders to the South African Railways in more remote parts of the country where transportation service is in demand, but traffic does not warrant the construction of branch rail lines. The department now has 75 motor buses and trucks operating, while motor service route mileage has increased in the last two years from 365 miles to 2,647 miles. The vehicles in use are small—1½ to 2 tons—and are fitted with either truck or passenger-carrying bodies. Stations are provided at points approximately five miles apart along the motor routes, and an average speed of 10 m.p.h., including stops, is maintained.

650 *Tons of L. C. L. Freight Now Handled by Trucks Daily*

Pennsylvania Trucks Speed Up Service

Local freight trains replaced on 1,000 *miles of line—Trucks serve* 500 *stations*

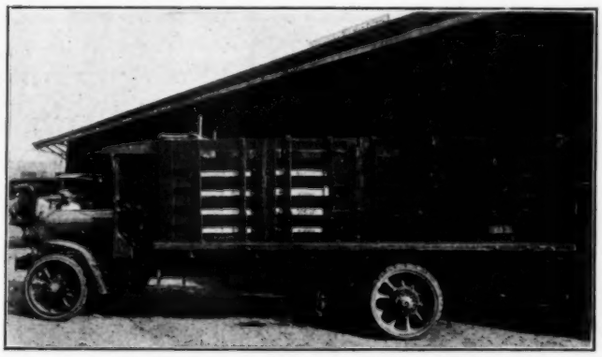
NOT only have savings been effected in operating expenses but the service rendered the public has been improved by the Pennsylvania as a result of its extensive replacement of local way freight trains with motor trucks operating on the highways. In addition, the operation of through trains has been facilitated by the elimination of interference to fast freight and passenger trains by the necessarily sluggish local freight trains.

Loading Heavy Freight at Paoli, Pa.

At the present time, the handling of l.c.l. freight is carried on by trucks operating on 33 distinct routes. Approximately 1,000 miles of railway lines are paralleled by the truck lines and some 500 railway stations are served. The motor truck operations involve about 2,600 motor truck miles per day, this varying of course from day to day as the trucks are manipulated to suit the operating convenience of the various divisions. It is estimated that approximately 2,000 daily freight train miles have been eliminated as a result of the taking off of 34 way freight local trains. Approximately 650 tons of l.c.l. freight are now handled daily by the Pennsylvania trucks.

Three Major Plans

The officers of the Pennsylvania had three plans in mind when the motor truck service was inaugurated. The first was the use of the motor truck in place of, or supplemental to, local package freight train service in congested short haul territory. The second was the motorization of terminals and the handling of inter-station and interline less carload freight by motor truck in congested terminal areas. The third plan was the direct collection and delivery of freight at the doors of shippers and consignees, or "store-door delivery." Of these plans, the first two have been put into effect. The third is still in process of study and development.



Trucks Are Used in Several Terminals

The replacement of way freight locals has been carried out, as stated above, on 32 sections of line. The first installation of this nature was made on July 9, 1923,

between Pittsburgh, Pa., and Beaver Falls, Pa., on the Eastern division of the Central region. Other units have been installed frequently since that time. The units have been altered occasionally and some have been abandoned, but the trend is toward the more extensive use of trucks.

Equipment

The Pennsylvania does not own any of the truck equipment with which it carries l.c.l. freight. All of the equipment is contracted for, being owned and operated in each instance by the largest and most responsible trucking company in the vicinity where the truck service has been installed.

While the number of trucks in service varies from day to day with the requirements, the average number now in daily operation is 53. Most of these are of five-ton capacity, but some are of two-ton and three and one-half ton size. Three tractors and nine trailers are also used at various points.

Plan of Operation

The plan of operation was described in the *Railway Age* of February 2, 1924. Briefly it is as follows: Freight is loaded from transfer stations into cars consigned to designated zone stations in the territory served by the trucks. These cars are then made up into local freight trains which drop the cars at the zone stations where the freight is transferred to the motor trucks, which then proceed over their routes, making deliveries at the freight stations and picking up outbound freight for transfer to through cars at their zone station terminals. The operation is controlled by the superintendents of the respective divisions, through the agents at stations along the routes of the trucks.

A shipper, sending package freight from a point served by a motor truck, delivers it to the Pennsylvania station at the originating point where a Pennsylvania bill of lading is issued to cover it. The shipment is then transported by truck to the next zone station and loaded into a freight car for transportation by rail to its destination. If a shipper sends a package from one town to another, both of which are served by Pennsylvania trucks and are on the same truck route, a bill of lading is issued by the Pennsylvania to cover it, although the shipment will at no time be carried by the Pennsylvania railroad on its trains.

Until April 1, 1926, none of the trucks were operated on schedules. The only condition that was met being the cleaning up of all of the freight on their routes each day. A 10-hour day is usually worked. On April 1, however, the Trenton division instituted a series of schedules to govern the 13 motor trucks in operation on that division. The schedules, which cover every route traversed by the various truck units on the Trenton division, were developed with the thought of giving shippers and consignees more definite information regarding the arrival and departing time of shipments. Scheduling the truck operations has also served to speed up the movement of l.c.l. freight in the trucking areas.

THE PENNSYLVANIA RAILROAD C. T. 867

_____ DIVISION

RECEIPT FOR AND RECORD OF L. C. L. FREIGHT HANDLED BY MOTOR TRUCK

Forwarded from _____ Station _____ (Date) _____ 192__

Arrived _____ M Departed _____ M For _____ (Destination or Transfer Point of freight listed below.)

Truck Number _____

WAYBILL REFERENCE				No. of Pieces	Weight	Exceptions
FROM	TO	Number	Date			

Freight covered by the above waybills received in Good Order except as noted

THE PENNSYLVANIA RAILROAD COMPANY

_____ (Truck Company)

Per _____, Truck Master. Per _____, Agent.

Date _____ 192__ Time _____ Date _____ 192__ Time _____

Form for Recording Freight Handled

THE PENNSYLVANIA RAILROAD C. T. 1008

Report of Mileage Made and Tonnage Handled on Unit No. _____

TRUCK { OWNER'S No. _____ / RAILROAD No. _____ DATE _____ 192__

STATION	TIME			LOADED POUNDS	UNLOADED		MILES	REMARKS
	ARRIVED	LEFT			STATION FROM AS INDICATED IN HEADING OF C. T. 867	POUNDS		

Truck Released _____ P.M. Certified Correct _____ Agent.

INSTRUCTIONS.

1.—Initial zone station agent will fill in number, date and columns 1 to 5 inclusive, and 9. Give Truckmaster three (3) copies.
2.—Agent at each station where truck stops will fill in columns 1 to 7 inclusive, and 9.
3.—At non-agency stations, Truckmaster will fill in columns 1 to 7 inclusive, and 9.
4.—At close of day, terminal zone agent will complete report, mail original to Supervising Agent, give Truckmaster one copy, and retain copy for his file.
5.—The "Unloaded" record, columns 6 and 7, must show the information called for, for each C. T. 867 separately.

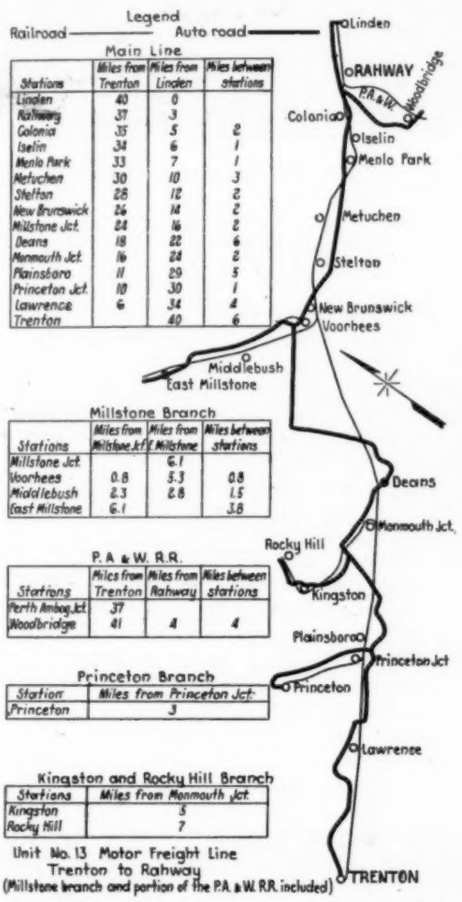
Mileage and Tonnage Report Form

New York Division Operation

A typical line operation is that on the New York division where two units involving four motor trucks are operated over a total line mileage of 60 miles. These four trucks have supplanted three local way freight trains. Located in this territory are three outstanding freight stations in point of rail service: Trenton, New Brunswick and Rahway. These stations have been designated as the zone stations and all l.c.l. freight, except lots of 10,000 lb. or more for stations served by the motor trucks, is loaded to these zone stations by trains carrying merchandise cars regularly to them. At the

zone stations the freight is unloaded from the cars and placed in the designated section of the freight station, to be picked up by the motor trucks. In loading the trucks the labor is performed by the truck master and helper who are employees of the trucking contractor. The freight is checked jointly by the truck master and the station's delivery clerk and a receipt is given for the freight by the truck master, with any exceptions as to shortage or damage noted. At the destination station the freight is again checked jointly by the truck master and the railway agent or his representative and receipt is given by the agent to the truck master.

The outbound traffic is handled in a like manner. The freight received by the trucks at the local stations is delivered to the zone stations and there loaded into the


Legend
Railroad
Auto road
Main Line
Linden
RAHWAY
P.A.&W.
Woodbridge
Colonia
Iselin
Menlo Park
Metuchen
Stelton
New Brunswick
Voorhees
Middlebush
East Millstone
Deans
Monmouth Jct.
Rocky Hill
Kingston
Plainsboro
Princeton Jct
Princeton
Lawrence
TRENTON
Millstone Branch
Stations | Miles from Millstone Jct | Miles from E. Millstone | Miles between stations
Millstone Jct. | | 6.1 |
Voorhees | 0.8 | 5.3 | 0.8
Middlebush | 2.3 | 2.8 | 1.5
East Millstone | 6.1 | | 3.8
P. A. & W. R.R.
Stations | Miles from Trenton | Miles from Rahway | Miles between stations
Perth Amboy Jct. | 37 | | |
Woodbridge | 41 | 4 | 4
Princeton Branch
Station | Miles from Princeton Jct.
Princeton | 3
Kingston and Rocky Hill Branch
Stations | Miles from Monmouth Jct.
Kingston | 5
Rocky Hill | 7
Unit No. 13 Motor Freight Line
Trenton to Rahway
(Millstone branch and portion of the P.A. & W. R.R. included)
Stations | Miles from Trenton | Miles from Linden | Miles between stations
Linden | 40 | 0 |
Rahway | 37 | 3 |
Colonia | 35 | 5 | 2
Iselin | 34 | 6 | 1
Menlo Park | 33 | 7 | 1
Metuchen | 30 | 10 | 3
Stelton | 28 | 12 | 2
New Brunswick | 26 | 14 | 2
Millstone Jct. | 24 | 16 | 2
Deans | 18 | 22 | 6
Monmouth Jct. | 16 | 24 | 2
Plainsboro | 11 | 29 | 5
Princeton Jct. | 10 | 30 | 1
Lawrence | 6 | 34 | 4
Trenton | | 40 | 6

Truck Lines on New York Division

through merchandise cars in the same manner as the freight originating in the zone cities.

Baltimore Terminal Operation

The use of trucks in the Baltimore terminal is the best example of such an installation on the Pennsylvania. The advantages secured in the use of trucks in terminals are an expedited handling of the freight and the release of cars for other service. In the past the transfer of l.c.l. freight in Baltimore required from one to two days. Now interchange is carried out in from one to two hours.

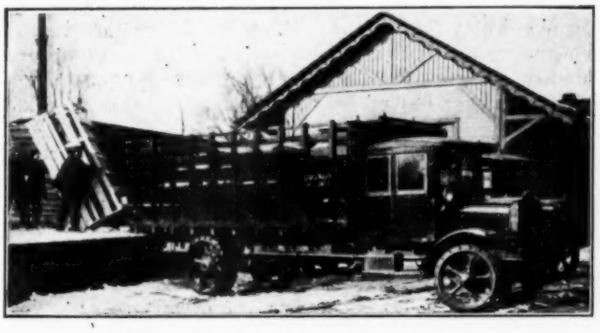
The Pennsylvania has two large freight stations at Baltimore, one at President street and another at Calvert street, and a number of other smaller stations. Freight is received in cars at main stations and instead of being rehandled into other cars and switched to the smaller stations, is loaded into trucks and trucked to the outlying stations. A similar method is used in the case of shipments outbound from the smaller stations.

The unusual requirements at Baltimore are met by six trucks, although more are pressed into service occasionally. These do not operate on schedule but are dispatched in accordance with each day's requirements. The trucks are also used in the interchange of l.c.l. freight with other railways and in making deliveries to shippers.

Other examples of the use of trucks in terminals are found at Detroit, Mich., Philadelphia, Pa., and Cincinnati, Ohio.

Contracts

When it has been decided to replace trains with trucks on a certain portion of the line, the largest, most responsible truck operator in the neighborhood is singled out and offered a proposition to contract for the service. If the truck operator is agreeable, a study is made of his costs of operation and these figures are used in fixing the rate paid him for his service. The elements of cost considered are depreciation, interest, taxes, license fees,



Loading a Pennsylvania Truck

wages, garage expenses, supervision and miscellaneous operating charges.

The truck companies pay the hire of the truck operators and their helpers and also keep inspectors in the field checking up on the efficiency of the truckmen. The dispatching of the trucks, however, is a part of the work of the Pennsylvania superintendent on the division served by the trucks. The truck operators, although employees of the truck company, are subject to the orders of the superintendent of the railway.

When any adjustment in the charges paid to the trucking contractor by the railway seems desirable, the railway retains the right to audit the books of the trucker and to increase or decrease the rates paid him on the basis of the railway's audit.

Careful records are kept by the railway of waybills covering freight handled by the trucks, and of the operation of the individual trucks, including the time of arrival and departure from stations, the amount of freight loaded and unloaded and the causes of any delays. The record of waybills is made in triplicate by the originating agent, the original and one copy being enclosed in an envelope and attached securely to the waybills, while the second copy is retained by the forwarding agent. The running report of the truck is filled in as follows: The initial zone station agent fills in the number of the truck, the date and the stations where stops are to be made, giving the truck master three copies. The agent at each station where the truck stops fills in the time of arrival and the number of pounds

of freight loaded and unloaded, signing his initials. At non-agency stations the truck master fills in this information. At the close of the day, the zone station agent completes the last line of the report, showing the time the truck is released and the number of miles operated, mailing the original to the superintendent, giving the truck master one copy and retaining the other copy for his file.

Records on truck operation are also kept by the contractors, showing the time a truck leaves the garage and its arrival at the starting zone station, the time of arrival at the end of the route, the time of starting on the return trip and of arrival at the zone station at the close of the day. The total tonnage hauled and the mileage covered are indicated and information is required as to any freight breakage or shortage. Reports on accidents and delays are also required. The truck master in charge is required to state the condition of his truck, the condition of the motor, the date when it was last inspected, when last greased, the amount of oil used, the amount of gasoline used, the condition of the license plates and lights, and whether or not he stopped at all railroad crossings before going over them. The name of the truck master and his helper are also shown as are the starting time, the finishing time and the expense.

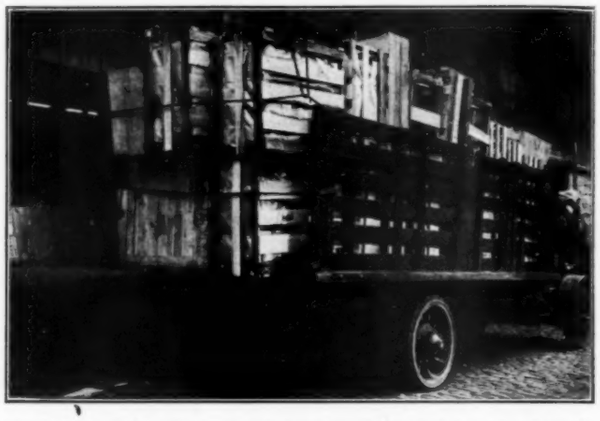
Railway agents are instructed to notify the trucks in advance when there is no freight at their stations for movement so that unnecessary calls at stations are avoided. Explosives and certain other dangerous articles are never moved by truck but are always handled by rail.

The trucks that carry freight for the Pennsylvania are fully insured and the railway assumes full common carrier liability for goods transported by highway, just as it does when the goods are carried by rail. In cases of damage, claims are paid by the railway and settlement made by it with the truck company involved.

Excellent Type of Truck Employees

The employees of the trucking companies assigned to the railway trucks are of a conspicuously splendid type. They show a marked and consistent interest in the successful operation of their trucks and go out of their way at all times, apparently, to keep the service at its maximum efficiency and to render satisfaction to shippers.

Many stories are told as evidence of this spirit. In one instance a truck master carried a bill of lading covering a roll of linoleum, but upon arrival at the destination zone station, found that his truck was short this shipment. Not content with letting the shortage go through and permitting the railway to pay for the loss, this truck master utilized his spare time for more than two weeks in hunting for the missing shipment. In the end he found it and turned it over to the Pennsylvania agent at the zone station.



All Kinds of L. C. L. Freight Are Handled by the Trucks

Results Secured

The advantages resulting from the utilization of trucks by the Pennsylvania can be summarized as follows:

(1) Greater efficiency and economy in operation.

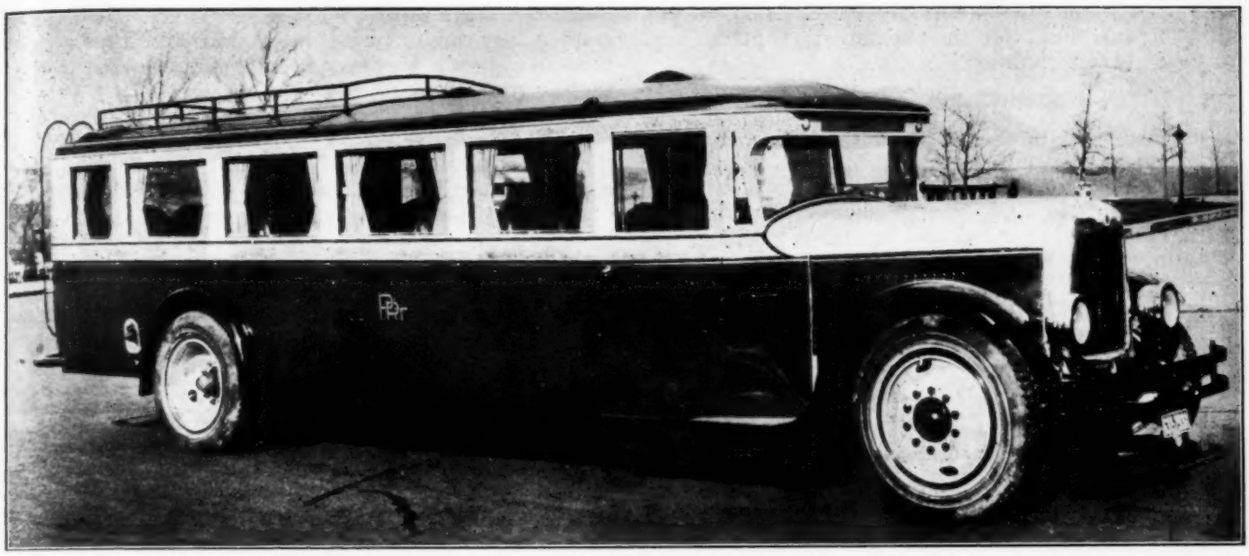
(2) Clearing the rails of the slowest moving form of freight traffic, thus increasing their capacity for other movement.

(3) Elimination of cross-overs required in the movement of local freights to reach stations on both sides of the tracks, thus also helping to speed up the general traffic movement.

(4) An approximate reduction of 50 per cent in loss and damage on package freight carried by trucks as compared with its former movement by rail due to less complicated handling.

(5) Expedited service resulting in increased business and greater satisfaction to patrons.

(6) Cheaper and much faster interchange of freight in terminal districts.



Why Motor Transport Regulation Is Needed*

Safety, economy, public protection and other factors render regulation essential to best and full development

By T. C. Powell,
President, Chicago & Eastern Illinois

THE railroad position in relation to motor buses and motor trucks operated as common carriers for hire, is based upon the broad question of common carrier transportation as a whole and, therefore, we feel it is a common sense attitude and in its essentials, is exactly the same position as adopted by the general public toward all utilities which depend for profit upon the daily needs of the public, namely:

1. That each medium of transportation should be compelled by proper regulation to assure to its patrons protection against inefficiency, high charges, unsafe vehicles, inexperienced operation and unsafe methods which tend toward monopoly.

2. That solvent and efficient carriers, whether by rail or highway, should be protected against irresponsible individuals and companies which, by reason of the present situation, may find it possible to use the facilities provided at public expense without paying a just tax for their use and without supervision.

3. That all carriers for hire should enjoy equal and exact justice in their treatment by the lawful regulating bodies.

4. That the public money raised by taxation should be spent for the benefit of the public only and should not be diverted to private interests without full payment therefor.

The ability to operate any vehicle satisfactorily depends upon the roadway or highway more than upon the vehicle or motive power.

It has been the responsibility of railroad officials to watch the development of the motor vehicle and to study its possibilities from the standpoint of a connection as well as that of a competitor, and to my mind, nothing is more definite than the conclusion that the hard-surfaced highway has been the advance agent of the competitive motor truck and bus. As proof of this, it seems only necessary to say that pending the improvement of the highways, the railroads looked with complacement upon the development of the automobile, or if a second item of proof is needed, let me remind you that the Federal Road Act became effective in July, 1916, just ten years ago, and that while it took nine years between 1910 and 1919 for the General Motors Corporation to sell its first million cars, it took only one year to sell the last million cars constructed.

The National Highway, built early in the last century and extending westward as far as Indianapolis, cost about $8,000,000. The first Federal Road Building Act carried an appropriation of $75,000,000 and afterwards was augmented by another appropriation of $200,000,000. The present hard-surfaced highways are therefore built out of public funds contributed by the local communities and by the county, state and national treasuries. All of these funds are raised through some form of taxation, toward which the railroads are contributing in ever increasing volume, so that they are now paying in taxes nearly $1,000,000 per day. Besides contributing in this way to the highway funds, the rail carriers are forced to incur heavy annual expenses in the way of watchmen, warning signs, and gates at highway cross-

* From an address before the Chicago Traffic Club open forum meeting on motor transportation regulation.

ings in the country as well as in the city, and to pay out enormous sums for the separation of grades and for general track elevation.

The Present Status of Regulation

At the present time 34 states out of the 48 regulate the operation of motor buses and 27 states regulate the operation of motor trucks, but under the decision of the Supreme Court in 1925, such regulations do not apply to trucks or buses operated only in interstate traffic. As indicating the attitude of Congress in another relation, I quote from the Transportation Act with respect to the admonition given to the Interstate Commerce Commission in connection with water transportation in which the commission is directed, "to foster and preserve in full vigor both rail and water transportation."

In the regulation of strictly intrastate transportation by highway, many state authorities are recognizing as their duty what the Transportation Act imposes upon the Interstate Commerce Commission, namely, the need for maintaining the rail transportation lines "in full vigor," and such state bodies are exercising their veto authority to that end and are refusing to grant certificates unless the public convenience and necessity can be clearly shown. Under the present laws no state body can control or regulate interstate commerce either by motor truck or motor bus, even though the highways over which these vehicles operate may have been built partly or wholly out of state funds. It is, therefore, now only necessary for an operator to extend his actual transportation across a state line to immediately become an absolutely free and uncontrolled, and in some cases, an irresponsible factor in furnishing transportation to the public.

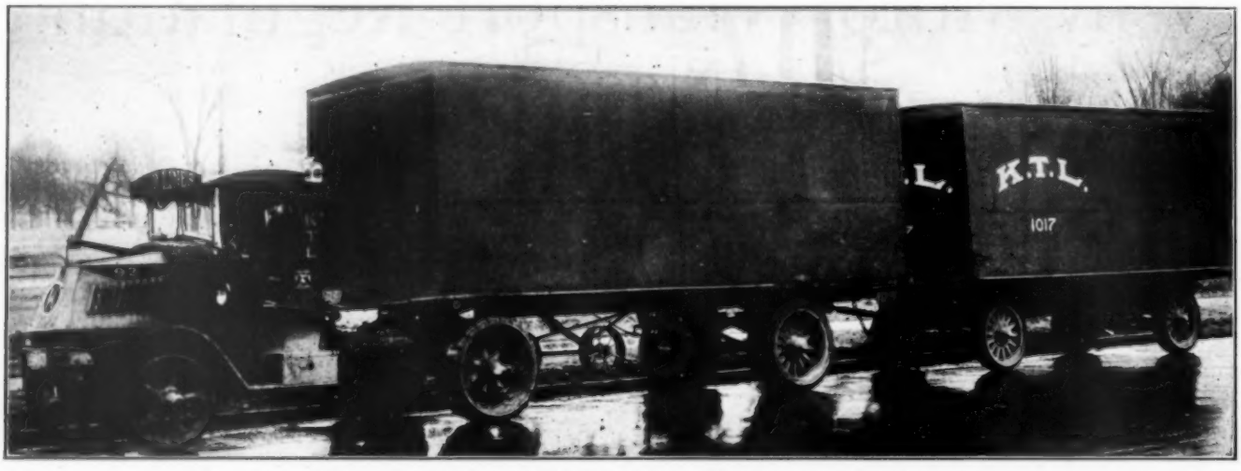
It is, of course, known that many railroad trains and many mile of track have been discontinued through lack of patronage, but perhaps it is not realized that some communities of a thousand or more are today without any passenger train service whatever, and must depend upon buses or private automobiles or traction lines or travel several miles to reach a station having train facilities. Many other centers now enjoy only through train service, inasmuch as the local trains have been withdrawn, as the receipts fell below the out-of-pocket costs.

Many experiments are being tried by the railroads to overcome this situation, some lines operating motor rail cars, others operating motor buses along parallel lines and others operating motor buses in combination with steam railroad trains. Many of these operations reduce the costs and are therefore beneficial to the public in general but they can, of course, be continued only so long as they may show a profit or a saving as compared to the regular train service.

Does not this situation suggest the thought that as the effect of automotive vehicle competition has been to force the discontinuance of many railroad trains, so that now such train service is not available, whereas it formerly constituted the only satisfactory medium, it is now the responsibility of those public bodies who deal with transportation problems under the laws creating them, to join in establishing and enforcing such regulations as will result in the operation of bus and motor truck lines amenable to the courts in case of accident or damage, and in furnishing service in winter and summer, in bad weather as well as good?

No Desire to Limit Highway Transport

I do not think there are many railroad officials who fail to realize that the private automobile has permanently absorbed a substantial portion of the local passenger traffic, or that the motor truck has taken over a great part of the short haul traffic, or that the motor bus is a useful addition to the passenger transportation facilities in certain sections. In other words, there are few, if any, railroad officials who do not realize that these changes are inevitable or who hope to relegate the automotive vehicle, whether bus or truck, to a more limited field of operation merely for the benefit of the steam railroads.



Regulation Should Extend to Contract as Well as Common Carriers

Transportation has always been a vital need of this country of great distances and it has developed to its present magnitude because of that need, but the marked change in the last few years is the result of a demand for a speedy vehicle for personal use and more convenient transportation. This demand has created facilities which are in excess of the actual needs of the population. Very few believe that the motor truck and motor bus, even combined with the private antomobile, can take the place of the railroad, and we have a striking example before us now in the wheat fields of the west where a new method of harvesting the grain and an active demand for the grain itself have resulted in an unusual pressure upon the railroads for long haul transportation; but I have seen no suggestion that this need can be filled by long haul motor truck service.

But, besides convenience, a man wants safety and reliability, particularly for his family, and as long as the interstate motor vehicle is not controlled by law and the

service maintained within the general scope of public convenience and necessity, it is not probable that the travellers by interstate motor bus or the shippers by interstate motor truck will be protected against the irresponsible operator.

Nine Principles

It seems, therefore, regardless of what the position of the railroad managers may be, that the situation requires the declaration of certain definite principles, i.e.—

1. That motor truck and motor bus service, both present and prospective should be subjected to the same scrutiny in the interest of safety and economy as now applies to rail transportation and development.
2. That the responsibility of the common carrier by highway should be fixed so that any damages to persons or property may be promptly recovered, and this properly involves not only a license to operate, but an indemnity bond to protect the public.
3. That as the highways are created and maintained through the expenditure of public money, some portion of this expense should be paid directly by those who operate on such highways for profit.
4. That as most of the prosperous communities in the United States are located on the railroads, having been built up through the efficiency of the railroads' service over a period of years, and as in the nature of things, the automotive vehicle does not create new routes of travel, the certificates or licenses should be granted only to those able to guarantee safe, reliable and efficient service, thus excluding those operators who have no claim for public recognition. This, in some cases, may result in giving certain operators a monopoly over certain routes, but this is a natural result and has already been found advisable in the cases of the telephone, electric light and gas companies and prevents a waste of money.

Such certificates would have the effect of limiting the automotive service to reasonable distances and thus prevent the operation of the vehicles at high speeds, which not only endanger the traveller but ruin the highways.

5. That the regulation should apply not only to those vehicles which operate between fixed termini, but to those who operate also between termini which are not fixed but which demand upon individual contracts. Without such control it does not appear possible to protect either the rail lines or the legitimate motor bus and motor truck lines.
6. That in the collection of passenger fares and freight charges, both the railroads and the public should be protected against cut rates, rebates and unfair practices.
7. That full hearing with right of appeal should be granted to all parties interested before a certificate is granted by any public body to a motor truck or motor bus.
8. That motor routes should not be permitted when it can be shown that the existing rail transportation is adequate.
9. That any certificate granted to a motor truck or motor bus to operate for hire should carry with it an obligation to maintain in all seasons a reliable, permanent and continuous operation, and this can probably be more definitely assured if the applicants are required to incorporate under the laws of one of the states and to state the names of the incorporators and officers and the capital invested or available.

These regulations are justified by the experience in other lines of business as illustrated by the fact that, in many communities, those who occupy a permanent location and pay rent and taxes and are of good repute in that community are protected against unlicensed vendors and hucksters who endeavor to take advantage of the trade already created by continuous operation and legitimate methods.

None of these proposed regulations will deprive the public of the benefit of honest competition by solvent carriers, but will result in schedules of rates and fares adjusted to the new means of transportation.

Railroad men recognize the burden under which the Interstate Commerce Commission is now working and would not willingly hamper it with any further details, but it would seem possible to draft a law which would give the Interstate Commerce Commission authority to adopt a few controlling, general principles to be enforced by the state bodies under delegated authority from the national body. This would tend to harmonize state regulations, would tend to make them uniform with those applying to interstate traffic, and would insure to the public a more responsible form of automotive transportation.

A Yellow Coach in Service on the Boston & Maine

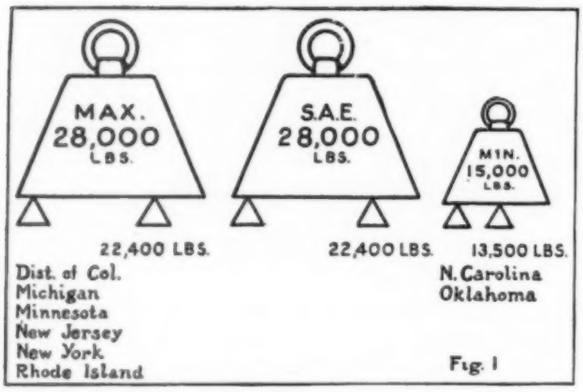


Fig. 1

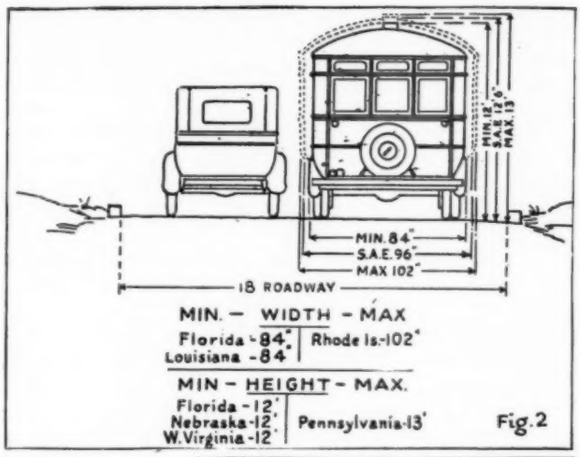


Fig. 2

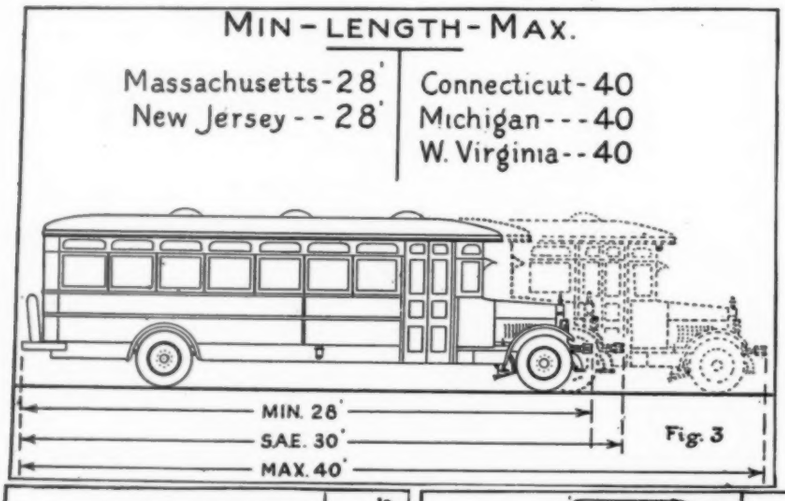
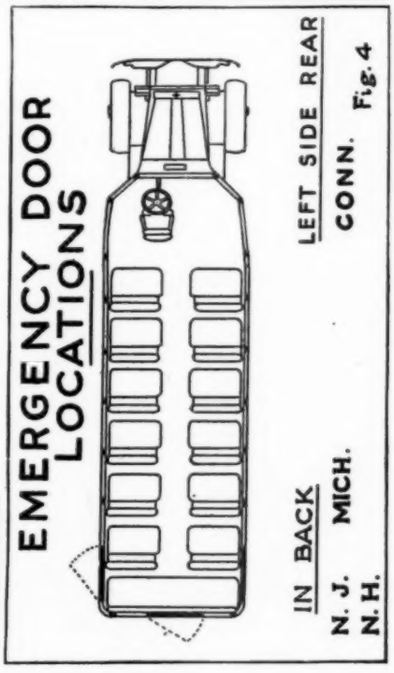


Fig. 3



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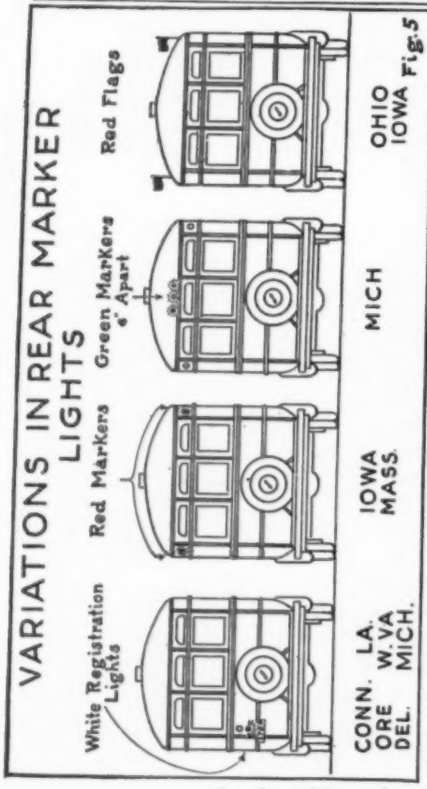
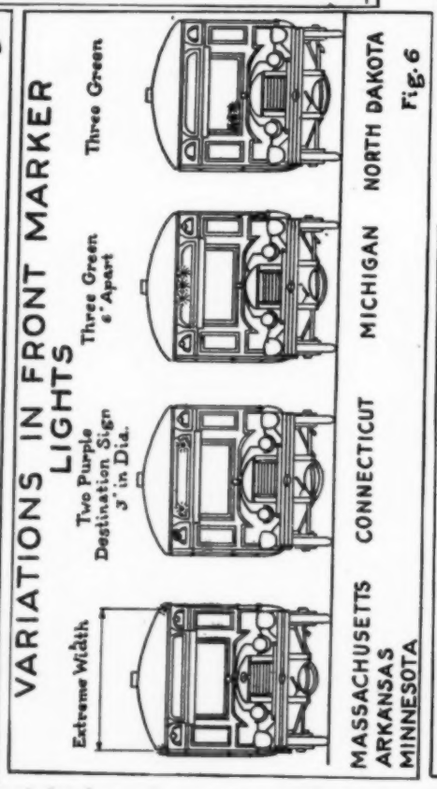


Fig. 5



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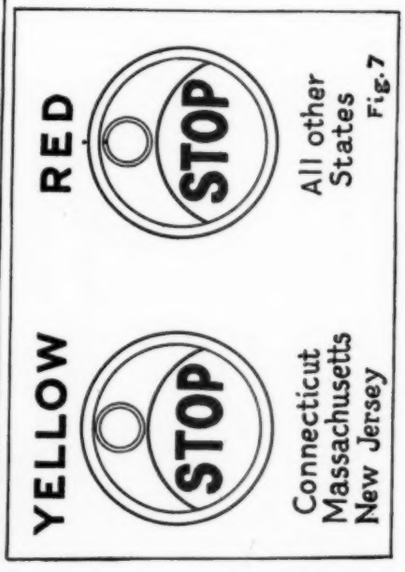


Fig. 7

Graphic Representation of State Bus Body Laws

Buses and Laws Affecting Them*

A summary of the laws of the states requiring certain bus equipment

By Merrill C. Horine,
Sales Promotion Engineer, International Motor Company, New York.

TODAY there are but eleven states, Alabama, Colorado, Delaware, Georgia, Idaho, Indiana, Kentucky, Mississippi, Nebraska, South Carolina and Tennessee, which have not passed special legislation regarding the design of buses operated within their borders. When, in 1925, the state of New Jersey enacted a set of laws definitely specifying details of design, each manufacturer carefully checked up his designs to determine what changes, if any, would be necessary to conform to these requirements. Practically every one was obliged to make one or more changes, and practically all were able to adapt their standard designs sufficiently to conform. Some developed special "New Jersey Type" bodies and New Jersey equipment. Others left the bodies and equipment for local New Jersey body builders to work out.

Thirty-four states in the last year have followed the lead of New Jersey, Florida and North Carolina and passed special legislation regarding the specifications of motor buses operated in public service. Some of the regulations prescribed have been minor and of no important effect. A number of them have been of the beneficial sort. But an alarming number have been of the burdensome type. Some of the provisions are sharply contradictory to those in other states and a sizable "nut list" has also been registered.

In the recently enacted Massachusetts law, for example, a gear-shift diagram is required. The writer knows of only one standard bus deviating from the S. A. E. standard in gear-shift positions. Wisconsin prohibits the use of double-decked buses in interurban service. On its face this sounds like a joke, but are we sure that that provision will not definitely bar out the new observation type buses which have recently appeared on the Pacific coast, wherein the rear end of the body is raised about three feet higher than the front end, providing a baggage space beneath and improving the view for the passengers in the rear of the bus.

South Dakota forbids the carrying of standees. That is all very well in New York City, for the disappointed passenger has other means of transit at his disposal. Motor buses in and out of smaller centers, however, are often the sole means of transit. Many of the railroads are now employing buses as feeders and connecting lines. In such service an excess of patronage over seating capacity might work severe hardship on passengers. Picture, if you will, a woman making connection from a train to a bus at a lonely junction point in South Dakota, at a late evening hour with no more buses until six o'clock the next morning, and not being permitted to ride because she would be a standee.

Some Odd Laws

Massachusetts requires a guard about the driveshaft so that if a universal should become loose or the shaft snap, the shaft cannot fall to the road or break through the body floor. How many accidents of this sort have been heard of? If this is necessary, then why not similar stirrups about the draglink or the tie-rod? Why not prohibit semi-floating axles, since a broken axle shaft will surely entail a lost wheel? Where shall we draw the line on such legislation? There is no particuar hardship in requiring us to fit a strap-iron stirrup about the driveshaft of every bus we deliver in Massachusetts, but the statute stands as a precedent and an invitation at emulation by other lawmakers ambitious to see their names at the head of the bill.

In Iowa, despite the fact that many efficient operators purposely omit them from the equipment to prevent tinkering by the driver, a new law requires that each bus be equipped not only with a full set of tools for repair work, but also spare parts! Can you picture a bus driver scraping carbon and grinding in the valves while the bus is on its route? Many operators of experience do not even provide spare tires on buses whose runs are 10 miles or less in length, but prefer for the sake of economy and safety to the passengers to have the job done right by a special trouble crew, a spare bus being sent out to transfer the passengers.

Limiting Specifications

Let us examine in detail just what our limiting specifications are and how they will affect our standard bus:

Weight. North Carolina and Oklahoma have restricted gross weight to 15,000 lb., which just permits standard 25 to 30 passenger buses to operate. The larger and heavier types cannot be registered. Other states allow from 16,000 lb., up to 38,000 lb., on six wheels.

Chassis frame. Regardless of whether the frame be made of low-carbon steel or heat-treated chrome nickel; whether pressed and formed to true truss form or merely knocked together of stock-rolled channel rails, New Jersey requires that it must be ¼ in. by 6 in., or $\frac{3}{16}$ in. by 8 in., and it must not be more than 35 in., from the ground.

Brakes. In Michigan it must be possible to stop the vehicle in 50 ft., from a speed of 20 miles per hour. California requires that the wheels must be capable of being locked at 10 miles per hour. New Jersey merely requires ability to hold the vehicle stationary on a 15 per cent grade. Rhode Island and Connecticut require the ability to lock the wheels with the vehicle in motion.

Exhaust Pipes. Massachusetts and New Jersey both require exhaust and heater pipes to extend to the rear of the bus.

Gasoline tank. New Jersey, Iowa, Connecticuit and Massachusetts wisely require the gasoline tank to be mounted outside the body, New Jersey further requiring that it be insulated from the frame by a "fireproof material."

Body dimensions. To New Jersey, principally, we are indebted for the restrictions on body dimensions and dimensions of the bus as a whole.

These dimensions are:

* From an address delivered at the annual convention of the Automobile Body Builders Association, Detroit, Mich.

Length—maximum, 24 ft.; minimum, 16 ft.

Width—maximum, 96 in.; minimum, 84 in.—Florida and North Carolina, maximum, 84 in.

Headroom—maximum, 78 in.; minimum, 76 in.

Overhead—maximum proportion, 7/24ths of length of vehicle, maximum length, 10 in. beyond frame.

Bumper overhand, 4 in. maximum beyond body—no rear tire carrier.

Door width, minimum, 24 in., in the clear.

Baggage. Connecticut requires that space be provided for baggage.

Emergency door. There is so much disagreement on this subject that for local use, the manufacturer has no choice but to build special bodies for use in certain states whose regulations depart from accepted standard practice. He may build a standard body, having the emergency door in the standard location, at the rear of the left side, but for some of the most important bus-using states he must provide special emergency doors at the back. He must also be prepared to place it in both locations on a single body for interstate service and for use in the state of Ohio.

The following states require the door to be in the back: Michigan, New Hampshire and New Jersey, with 24 in. width in the clear. The S. A. E. standard calls for 18 in. clear width. Connecticut requires the emergency door to be at the rear of the left side and fitted with an approved device. Connecticut also requires a clear passageway eight inches wide to the door. Either left side or rear are permitted by: District of Columbia, Iowa, Massachusetts, New York, Vermont and West Virginia.

Grab rails or straps. Required in Massachusetts and New Jersey.

Passenger signals (buzzer). Required by Massachusetts and New Jersey.

Window guards. Required by New Jersey.

Wheel housing. New Jersey requires that this be made of 12-gage metal, regardless of what the metal is.

Hinge guards. Required on bodies having more than one door to a side (sedans) by Connecticut.

Grab-handles. Required at each receiving door by Massachusetts, while New Jersey forbids outside grab-handles. They must therefore be made so that they may readily be detached and moved from the inside to the outside and reverse for buses whose operations carry them into both states. As most bus operators agree with the New Jersey regulation, standard bodies must be built without outside grab-handles, the handles being specially applied for Massachusetts orders, along with the driveshaft stirrup.

Driver's protection. A partition back of the driver's seat, provided with a ventilator is required by New Jersey, while Connecticut expressly forbids any interior obstructions which would prevent a full view of all parts of the bus interior from any point within it. Massachusetts requires a guard rail about the driver, making no exception in the case of parlor cars which do not carry standees.

Footboards. Metal or fireproofed wood footboards are required by New Jersey.

Marker lights. Markers indicating the full width of the bus are required in Arkansas, Massachusetts and Minnesota. Michigan requires three green lights placed horizontally, six inches apart at both front and rear. North Dakota requires three green lights at the lower right side of the windshield. Connecticut, however, requires the front markers on the destination sign to be of purple and three-inches in diameter.

Direction indicator. This device is required by Arizona and Washington.

Door annunciator. Even though the emergency door is never opened in normal operation, Connecticut insists that this door be equipped with an annunciator light on the dash. Connecticut requires annunciators of similar type for all doors on a sedan type body.

Registration light. A white light to illumine the license plate at the rear is required by six states, namely Delaware, Louisiana, Michigan, Oregon, West Virginia and Connecticut.

Courtesy light. A white courtesy light on the left side is required on all vehicles over 72 in. wide in Oregon and Washington.

Tail light. All states but North Dakota require a red tail light. In the latter state the law says green. Interstate buses operating through that state must therefore have two tail lights.

Stop light. Three states require stop lights and all specify that they must be of yellow color, namely, Connecticut, Massachusetts and New Jersey. Connecticut further specifies that such a stop light must have a lens four inches in diameter, a six c.p. lamp and must be wired in series with a monitor light on the dash.

Interior lights. These must be of five c.p. per seat according to both Connecticut and New Jersey.

Heaters. Required by seven states, namely District of Columbia, Illinois, Kansas, Montana, North Dakota, Ohio and New Jersey.

Ventilators. Required by the District of Columbia, Massachusetts and New Jersey.

Destination sign. The following states require destination signs: California, Connecticut, District of Columbia, Maryland, Massachusetts, New Jersey, New York, North Dakota, Oklahoma, Rhode Island, Utah, Vermont and West Virginia. Maryland requires destination signs on both sides as well as in front. Oklahoma and Utah require that the letters shall be four inches high and Massachusetts requires the legends: "Special" and "No Passengers" in addition to the others.

Windshield wipers. Required in Iowa, New Hampshire and Massachusetts, the New Hampshire law requiring them to be automatic.

Red flags. Obligatory in addition to marker lights in Iowa and Ohio.

Flashlights. One in North Dakota and two in Ohio are required.

Fire extinguishers. Required by a dozen states, to wit: Arkansas, California, Connecticut, Massachusetts, Montana, New Jersey, New York, North Dakota, Oklahoma, Oregon, Vermont and Virginia.

Speedometers. Required by another dozen states, as follows: Connecticut, Massachusetts, Michigan, Montana, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island and Virginia.

Spare tires. Required by only nine states, these being: California, Illinois, Iowa, Kansas, Montana, North Carolina, North Dakota, Ohio and Virginia.

Rear-view mirrors. Required by 28 states. The list is too long to recount here; but it is interesting to note that New Jersey and Massachusetts, require two—one inside and the other outside.

Lock. Despite the fact that a motor bus is almost never left unattended, four states, District of Columbia, Rhode Island, Vermont and Massachusetts, require that a lock be fitted, the District specifying that it must not be a wheel lock.

Warning signals. Gongs, bells, whistles and sirens are prohibited in various states, while Massachusetts requires an exhaust whistle.

Tire chains. Required by Iowa, Maine, North Dakota, Ohio and Masachusetts.

Fenders. Must be eight inches wide if the bus is to operate in Michigan.

The New Northland Garage at Minneapolis

Northland Consolidates Maintenance Facilities

Great Northern bus subsidiary services 100 *buses at new garage in Minneapolis*

GREATLY increased capacity for maintaining its motor bus equipment was secured by the Northland Transportation Company, the bus operating subsidiary of the Great Northern, in the construction of a large garage and shop at Minneapolis, Minn., the center of its operations. This garage replaced three garages

Tire Storage Racks—The Northland Leases Its Tires, Repairs Being Made by the Tire Company

in Minneapolis, in which repairs to the Northland buses had been made since the organization of the company.

These garages were acquired by the Northland Company when it was organized by the Great Northern and began operation with the equipment and facilities of three independent bus lines, which it purchased and merged. Maintenance of the buses in these garages was unduly expensive, on account of their small capacity and the waste incident to the duplication of equipment and facilities for making repairs. In its new garage the Northland is maintaining the 100 buses the operations of which center at Minneapolis without such losses in time and money. In addition to its maintenance facilities at Minneapolis, the Northland has a garage and repair shop at Duluth, Minn., where 40 motor buses operating in that vicinity are maintained.

Minneapolis Garage Specially Designed

The Northland garage at Minneapolis was completed about two months ago. It was especially designed to accommodate not only the making of light and heavy repairs to buses, but to provide space for the general office of the company. The building, which is of hollow tile construction on steel girders, is 160 ft. wide and 220 ft. long. At the present time it is being extended 64 ft., the building as originally constructed having been found inadequate to handle the increasing demands upon it, which followed the expansion of the Northland bus operations. With the 64-ft. addition it is expected that the garage facilities will be sufficient to meet necessities for some time in the future.

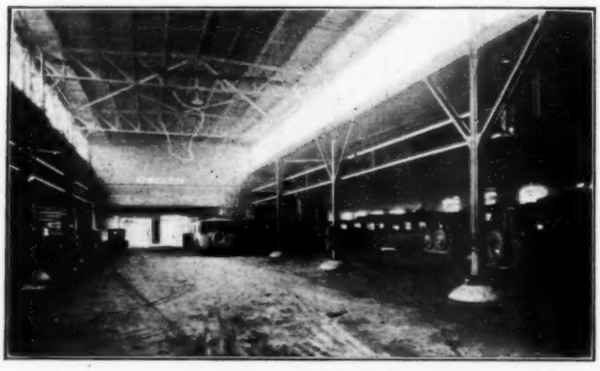
The Carpenter Shop Where Bodies Are Rebuilt

A second story, with dimensions of 96 ft. by 32 ft., extending over the runway of the garage, is used for the general offices. Most of this space is taken up by the accounting department and the cashier's office, the balance being used for the private offices of the president and general manager and the two assistant general managers.

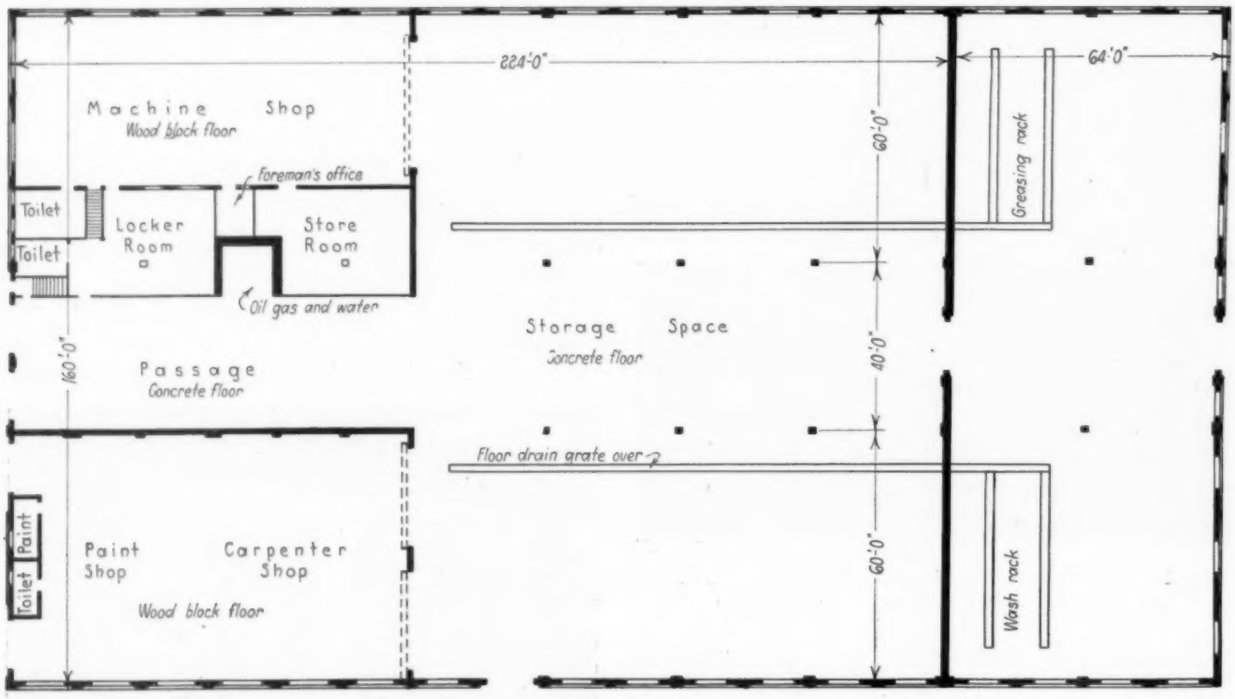
The garage is divided into various departments. On the left hand side as one faces the garage is a large locker room for drivers and mechanics, with separate lavatories for the road employees and for those working in the shops. Adjacent to these is the machine shop were heavy repairs to the various bus units are made. The stores department and the office of the purchasing agent are adjacent to the machine shop. On the opposite side across the runway are the carpentry and paint shops.

Back of these departments extends the general garage, where minor repairs to the buses are made. Back of the garage section is the addition now being constructed which will be partially walled off from the remainder of the garage. In this will be located the washing-racks, and elevated inspection racks for greasing and oiling the buses. An open space back of the garage building is used as a storage yard.

While the floor of the light repair section of the garage is of concrete, those of the machine shop, carpenter shop and paint shop and storeroom are of creosoted wood blocks. The entire building is equipped with a sprinkler system and the garage also has a number of hose lines and chemical fire extinguishers.



The Main Garage Where Running Repairs Are Made



Floor Plan of the Northland Garage at Minneapolis

Equipment

The machine shop where heavy repairs are made has the following equipment: a 22-in. lathe, with a 12-ft. bed; a 12-in. lathe, with a 6-ft. bed; a 22-in. drill press; a 10-in. drill press; a 6-in. by 6-in. shaping saw; a floor grinder with stand; a tool post grinder; a valve facing machine; a brake lining machine a 30-ton press; a main bearing boring tool; a bearing re-babbitter; a 14-in. forge; and a nut shear.

The carpenter shop has a single spindle shaper, with shaper fence and safety guard, the table being 36-in. by 36-in.; a 10-in. saw table; a 36-in. by 36-in. hand saw; a 10-in. joiner; a 24-in. planer; a steel hand bending brake, 8 ft. long; throatless shears; a brass polisher; a raising hammer; a 48-in. metal roll, and a metal shear.

The electric department has a testing stand; a 6 and 12-volt magnetizer; a Testermeter; an off and on puller press; a combination tester for lights and spark plugs; facilities for discharging batteries; and a battery charger.

Store-room

In the garage there is a steam cleaning outfit; a compressed air car-washer; a lubricating machine operating on air pressure; a tractor equipped with a one-ton crane; and an air compressor.

The store-room is equipped with a complete stock of

parts for all kinds of buses operated by the Northland. The Northland operates 11 makes of buses in 19 different models. It does not depend upon the agencies of manufacturers located in Minneapolis for parts required from day to day, but maintains a complete stock to satisfy all needs in its own store-room. The stock includes extra motors, radiators, stearing gears, springs, front and rear axles, etc. A stock clerk is on duty at all times in the store-room.

The purchasing agent, whose office is adjacent to the store-room, handles the purchases of parts to replenish the stock.

Personnel

In all, the Northland employs 80 mechanics to maintain the 100 buses centering at Minneapolis. Of these, 50 are assigned to day duty, and 30 to night duty. All heavy repairs to units are done in the daytime.

Of these employees, four are in the tire department, four are greasers, four inspectors, six washers, two machinists, two electricians, one battery man, one electrician's helper, two blacksmiths, five motor men, one air-brake man, one brake liner, two brake men working on the garage floor, two building transmissions and driveshafts, three painters and one helper, and nine carpenters.

The remainder of the employees are assigned to the main garage making running repairs to the buses. Also a man is assigned to pressing the uniforms of the drivers, this work being done in the drivers' locker room.

Maintenance Methods

All buses coming in after the day's work are washed and run on to the inspection rack, where they are greased. After the driver's report as to the condition of the bus is checked by the inspectors, it is run into the shop for the necessary repairs, if any.

This inspection takes place while the buses are being greased, and includes inspection by a tire man. The Northland does not own the tires used on its buses but leases them from a tire company on a mileage rate, the tire company making all repairs.

Light carpentry work is done as necessary, an upholsterer and two carpenters being assigned to the inspection rack to check over the buses when they are brought in from their runs. The Northland will soon schedule the painting of its buses to provide for repainting every eight months. On the basis of the present bus equipment of the company, three buses will be repainted each week.

The Heavy Repair Shop Where Motors and Other Units Are Rebuilt—The Storeroom Is at the Left—The Tractor Is Used for Carrying Motors and Other Heavy Parts

The oil in the bus motors is changed every 800 to 1,200 miles. Certain parts of the buses are greased after each day's operation, the remainder being greased every 500 or 600 miles.

Inspection Scheduled

Under the direction of H. E. Larsen, master mechanic in charge of the Northland garage at Minneapolis, an index system has been installed which provides for periodical inspection of the various parts of the buses. Each bus is represented in the file by a set of cards,

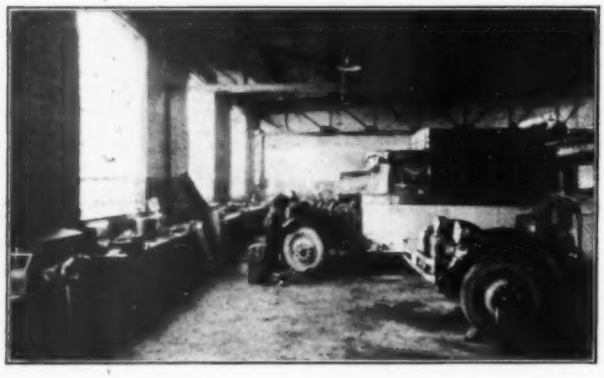
which show complete data on when inspections have been made. These cards, which are white, are arranged in time order, so that they appear at the front of the index file on the days when inspections of a certain nature are due.

On the day when a regular inspection of some part is to be made, a clerk in the office of the master mechanic copies the instructions for the inspection on a yellow slip which is turned over to the foreman in charge on that day. These cards are used not only to schedule repairs but are useful as an index to show the service being given by the various parts, since the nature of repairs made are noted.

When heavy repairs to units, such as the motor are to be made, the unit is removed from the bus and taken to the machine shop where a tag is made out showing the name of the unit and the defective parts. This tag also shows the number of the bus from which the part was taken, the date when it was removed, and the mechanic removing it. It also shows the date the part was repaired and the date when it was returned to a bus.

This tag is then taken to the stock room where it is filed, these also providing a check upon the performance of the various units.

A similar card is provided for filling out when batteries are removed from buses and replaced. Cards



Running Repairs Are Made on the Main Garage Floor

show the condition of the battery and the dates when tests have been made. Tests for the efficiency of the various batteries are provided for in the form which shows the date when tests were made for each battery and the results of the tests.

The bus operators' report card, which is carried on each bus all day, shows the number of miles operated, the report of the operator as to defects in the bus noticed during the day, and in the lower part, the number of gallons of gasoline and quarts of oil used.

Inspection Cards

The periodical inspection cards are numbered from 1 to 13. Inspections are made as follows: Card No. 1, Bearings, rear wheels, and spindles, monthly; No. 2, Brakes, when needed; No. 3, Bearings, front wheels, and front end overhaul, monthly; No. 4, Bearings and driveshaft, monthly; No. 5, Stearing gear and transmission, monthly; No. 6, Carburetor and clutch, monthly: No. 7, Differential and radius rods, monthly; No. 8, Generator and fan, monthly; No. 9, Motor and main bearings, every 30,000 miles; No. 10, Valves, weekly; No. 11, Starter and magneto-distributor, monthly; No. 12, Air springs and air pumps, weekly; No. 13, Application valves and regulating valves, weekly.

Highways Largest Passenger Carriers—Railways, Freight

By Henry R. Trumbower
Economist, U. S. Bureau of Public Roads

THE highways of the country have become, in a sense, the primary passenger carrier transportation agency and the steam railroads still remain the principal freight carriers. The 17,597,702 passenger motor vehicles, based upon an average capacity of four persons per car, represent a total passenger carrying capacity of 60,390,808 persons. More than half of the country's total population can be carried at one and the same time by the existing number of passenger automobiles. If we assume that each of these passenger cars are operated an average of 5,000 miles a year and that 2½ passengers are the average number of passengers carried per car, we arrive at a total passenger automobile mileage of 219,971,272,000 miles. A large part of this passenger mileage is produced wholly over city and town streets. Facts have not yet been developed which show accurately what proportion of this estimated passenger mileage is produced on the rural highways and what part is to be credited to city streets. An estimate that one-half of the total passenger car mileage is found on the rural highways appears, however, to be conservative from every point of view. If we make this apportionment we arrive at a figure of 109,985,636,000 passenger miles as the annual passenger mileage carried by the highways of the country. In 1925, it is reported by the Interstate Commerce Commission, that the total passenger mileage of Class I railroads amounted to 35,963,862,000 passenger miles. It is, therefore, safe to estimate that automobiles of the country carry approximately three times as many passengers one mile over the rural highways as the steam railroads carry.

The electric railways are said to produce about 13,000,000,000 passenger miles. When these are added to the passenger mileage of the steam railroads, we get a total of 48,963,862,000 passenger miles as against a total of 219,971,272,000 passenger miles produced by automobiles over both city streets and rural highways. This demonstrates clearly that the automobile is our principal passenger carrier.

Motor Cars Have Greatest Carrying Capacity

The passenger carrying capacity of the railroads is limited to 41,399 passenger cars and coaches with a total capacity of 2,612,056 passengers. The passenger carrying capacity of the automobiles is 60,390,808, or almost 30 times as great as the steam railroads' passenger carrying capacity. The electric railways have in service approximately 100,000 passenger cars which have an estimated passenger capacity of approximately 4,000,000 passengers. When this passenger capacity is added to that of the steam railroads it is still evident that the automobiles of the country have by far the greatest passenger carrying capacity of any of the transportation agencies.

When a study of the freight service is made a different result is seen. The 2,453,341 motor trucks in use have an average carrying capacity of 1¼ tons. Approximately 82 per cent of the trucks are estimated to be of one ton and less capacity, which indicates that the small capacity truck predominates. The total freight carrying capacity of these trucks, therefore, amounts to 3,066,676 tons. The freight cars, of all kinds, operated by and over the steam railroads of the country number 2,547,169. The total capacity of these railroad freight

cars which are in service is reported to be 111,450,034 tons. It appears, therefore, that the total motor truck capacity is but 2.8 per cent of the freight carrying capacity of the railroads. How much freight these trucks actually carry cannot be ascertained definitely nor can it be readily estimated. If we assume 10,000 miles as the average annual mileage per truck and apply this mileage and the 1¼ ton average capacity to the total trucks in use we arrive at a total capacity mileage of 30,666,676,500 capacity ton miles. This figure is far from the actual ton miles produced. The various traffic surveys made thus far show that only two-thirds of the trucks operating over the highways carry loads and that these loads average about 80 per cent of the capacity of the trucks. When adjustment is made for these facts it is seen that the estimated ton mileage of motor trucks is reduced to about 16,355,526,667 ton-miles. The total freight ton mileage of the steam railroads was reported to have been in 1925—414,139,835,000 ton-miles. The estimated ton mileage produced by the motor truck is, according to these figures, about 3.8 per cent of the total freight ton mileage of the railroads of the country. To just what extent this ton mileage was produced over our rural highways is difficult to tell. If we assume that half of the motor truck mileage is produced over city streets and half over rural highways it would appear that a fair estimate of the services rendered by motor trucks over rural highways is about 8,000,000,000 ton miles. This is about 1.9 per cent of the ton mileage produced by the railroads in 1925.

These estimates indicate clearly that the highways are essentially passenger carriers and the railroads are still the important freight carriers. There is no doubt that a very considerable number of the passengers carried over the highway by automobile are persons who would avail themselves of the railroad service if motor vehicle transportation did not exist. How large this number is cannot be definitely ascertained. About a third of the passengers riding in automobiles on the rural highways are on business, the remainder may be classed as non-business users of the highways. In a Louisiana traffic count it was shown that 93 per cent of the highway passengers traveled in privately owned and operated automobiles and 7 per cent used motor buses.

Great Increase in Freight Traffic

The per capita passenger mileage produced by the steam railroads remains practically stationary but in case of freight traffic a great increase is observed. The freight ton miles in the decade 1890-1899 were 1,355 per capita; in the decade 1900-1909 they were 2,247 miles; in the period 1910-1916 they were 2,983 miles per capita, and in the period 1917-1920 they were 3,830 miles per capita. In the six-year period 1920-1925 the average freight ton-miles were 3,468. The passenger mileage per capita had increased from 276 miles in the 1900-1909 decade to 348 miles in the period 1920-1925, or 25 per cent. The per capita freight ton mileage increased from 2,247 ton-miles in the 1900-1909 decade to 3,468 ton miles in the period 1920-1925, or 53 per cent. This indicates a much greater increase in the freight ton mileage than in the passenger mileage per capita. But going to the 1890-1899 decade we find that the passenger mileage per capita increased 44 per cent in the 1900-1909 decade over the previous decade and the freight ton mileage per capita increased 66 per cent. The tendency for the freight ton mileage to increase faster than the passenger mileage was noted even at that time before motor vehicle competition became a part of the picture.

Long distance motor truck traffic is not encountered to a great extent on our rural highways. The average trip mileage in all of the sections of the country where traffic surveys have been made is relatively short so far as the motor truck is concerned. The average motor truck haul ranges from 23 to 26 miles; 40 per cent of the truck movements on rural roads are less than 10 miles in length; 76 to 81 per cent of the trucks are operated over routes less than 30 miles in length. Not more than 2 to 4 per cent of the trucks operated over rural highways travel over 100 miles.

Motor Truck's Field

The motor truck's distinctive field of service is in short haul area where pick-up and delivery service is essential. The commodities hauled are primarily foodstuffs and perishables; about 40 per cent of the traffic consists of vegetables, fruits, milk, butter, agricultural produce, and truck crops. This is really an element of market distribution. On the railroads the products of agriculture and of animals comprise about 11 per cent of the total tonnage. Another significant movement by truck is the hauling of building materials, gravel, crushed stone, rock, and lumber. These are all short distance movements usually from a yard or quarry to the point where they are being used.

Where so-called long distance hauling by truck takes place it is usually found that it consists of specialty hauling, such as furniture, or it consists of commodities where time is more essentially a transportation element than costs.

Air Brakes for Buses*

By A. S. Benton

Westinghouse Traction Brake Company

THE motor bus of today is rapidly becoming a safe, fast comfortable means of transportation. Of the many factors which combine to insure successful bus operation, there is one of vital importance which at times fails to receive the consideration that its value warrants. Better brakes is a subject which cannot be too forcibly emphasized in the present day of traffic dodging.

Is an air brake necessary to stop a bus in the shortest possible distance from any speed? The best practice in heavy vehicle design is said to have determined that the maximum total multiplication between the pedal input and the brake cam output is about 36 and between the hand lever and the cam, about 50. This is the maximum multiplication because an increase in the multiplication to obtain more power at the cam would increase the travel of the foot pedal or hand lever to the extent of making it impracticable for use. To explain it in a way that is familiar to railroad men, the higher we make the leverage on car rigging to transmit more power from the brake cylinder to the wheels, the more piston travel we shall have, considering the shoe clearance and lost motion in the rigging, constant.

Now more braking power could be obtained by increasing the leverage but it would make the piston travel too long for practical purposes. Instead we leave the leverage the same and a larger brake cylinder is supplied which will give the increased power without the increased piston travel.

The same condition prevails on the bus. A man can exert about 200 lb. pressure on a foot pedal and about

* From an address delivered before the Southeastern Air Brake Club, Atlanta, Ga., on July 16, 1926.

150 lb. on the hand lever. This force is constant as far as the manual brake is concerned and the solution is the same as on the railroad car—apply more force at the source.

Air Brake Operation

With the air brake, there is an ample supply of force actuated by brake chambers. The compressed air is created by a small continuous duty air compressor driven from the bus engine. Practically all bus manufacturers have made provision on their engines for driving the compressor. The air is stored in small light weight air reservoirs mounted on the bus chassis. The air is controlled by either a hand or foot control valve. When the driver moves the control valve to application position, air passes from the reservoir through the control valve to the brake chamber. The brake chamber is very similar to a brake cylinder except that the air is confined to an air tight chamber behind a composition diaphragm. This eliminates the possibility of leakage. Axle manufacturers have designed special axles whereby the brake chamber is mounted directly on the axle. This eliminates all lost motion in the brake rigging and insures against any brake rod failures. The brake chamber actuates the cam shaft which in turn causes the shoe liner to press against the revolving drum liner.

Metal-Against-Metal Brakes

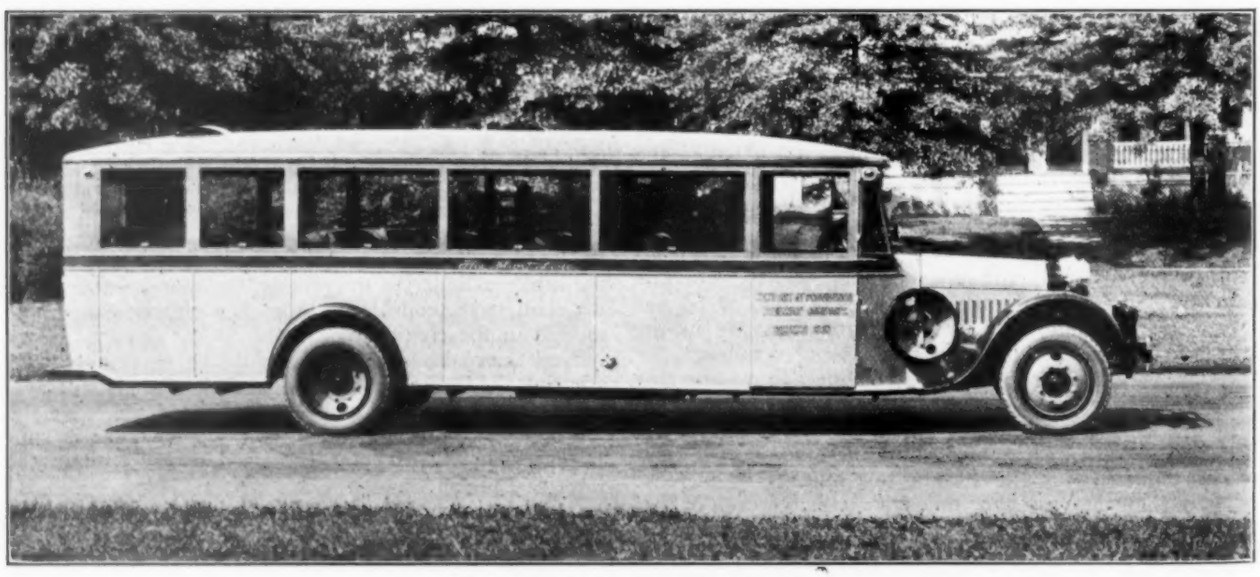
One of the many advantages derived from using air for power is the possibility of using metal shoe liners and metal drum liners. Metal-to-metal brakes have been tried before but have failed mainly because the low coefficient of friction between the two metal surfaces requires more force than can be exerted by the ordinary foot or hand brake. The advantages of the metal-to-metal brake are now realized because the air furnishes ample force for the proper retarding effect.

In driving a bus equipped with the metal-to-metal air brake, there is no fear of burning out the brake linings. In coming down a long grade, the brakes are set for a certain speed and the bus will come down any length grade without any undue heating of the brake assembly, even though the linings have been splashed by mud and water from the road.

The metal-to-metal air brake then supplies the demand in that it furnishes the maximum retarding force all during the stop. With better brakes come faster schedules. The driver knows that he can stop his bus, no matter what size, just as quickly as the privately owned automobile in front of him, which means that he will keep his place in the line of traffic because automobiles will not be continually filling in a space which he has left between him and the car ahead for a safe stopping distance. It means that he can run longer at maximum speed and make better average time. In running through congested traffic, he can wait longer to apply the brake because he knows that when he does they will take effect at once and bring him down to a smooth stop in the shortest possible distance.

But in order to operate any vehicle fast through traffic, there must be an assurance of safety. With the use of air there is ample power to stop the heaviest type buses and a reserve for emergency stops including power to take care of varying road and grade conditions. The instant equalization of air insures the same retarding force on all wheels, thus eliminating the chances of skidding. In selling a bus, you must sell also the idea of safety. Some companies are using air and air compressors to operate doors, fare boxes, air horns and to inflate tires. An additional safety feature can be obtained by air interlocking the doors with the brake to prevent the bus from being started until the doors are closed. Bus companies using air brakes have found that the powerful, flexible equalized brake increases the life of the brake lining and the period between adjustments. The driver knows that a powerful brake is available and hence is not forced to use them so much. This is true even of the fabric linings, and experience has shown that the metal shoe liners will last about six times as long as the fabric linings, and the metal drum liners about four times as long as the ordinary drum. Lining replacements are cheaper to make and can be made more quickly than the fabric. The earning power of the bus is increased because the bus does not have to come to the shop so often for brake adjustments and lining renewals.

Air brakes for buses are rapidly being recognized as a necessity. Fourteen leading bus companies have made it standard and practically all of them have made provisions of installing it when specified.



A White Bus in Service in Rhode Island

New Equipment

A. C. F. Bus Announced

A MOTOR bus of completely new design is announced by the American Car & Foundry Motors Company of New York. Its chassis dimensions are, wheel base, 230 in.; overall length 357 in.; tread, front, 70⅝ in.; rear, 78 in.; overall width, 96 in. The power plant is the six cylinder Hall-Scott engine, which develops 90 brake horse-power at a governed speed of 1,750 revolutions per minute.

The engine has complete valve, cam and governor mechanisms located in the head so that by interchanging the heads when one engine is in need of such attention, a single spare head can take care of the service requirements on that part of the engine of a number of buses. The cylinder block is a casting of semi-steel and the engine is designed so that it is less expensive, it is said, to put in new pistons and cylinder blocks than to re-grind the old block and fit it up with over-sized pistons.

The lubricating system is provided with a filter and a means of removing the condensed moisture and fuel dilution so that the crank case oil does not need to be changed until it begins to break down.

The frame is of heat treated pressed steel, with a maximum depth of 11 in., tapering to 6 in., at the front and rear. It is stepped up over the front axle and arched over the rear axle, and has a three inch flange throughout the entire length. Three pressed steel cross members are provided in the central portion of the frame, these being gusseted and hot-riveted into place. Tubular cross members are welded into a frame at both ends of the rear spring so that spring torque cannot be transmitted through the side rails.

The springs are wider than is customary, the front springs having dimensions of 49 in. by 4 in., and the rear springs, 64 in. by 5 in. This length gives a very slow period of vibration, and the periods of the front and rear are as far apart as possible so that the vibrations of one set of springs will not build up in the other and cause a galloping effect.

The front axle is a special Timken design, being of the "I" beam drop center type with straight thrust roller bearings in the steering spindles and opposed Timken tapering roller bearings in the wheel hubs. The springs are carried on top of the front axle. The rear axle is also a special Timken design of the underslung type with the worm mounted between Timken tapered roller bearing and with a Hyatt roller bearing on the shaft. The springs are mounted beneath the rear axle.

Westinghouse steel shoe air-brakes are standard equipment, these operating on the rear wheels only. The hardened steel drums are 16½ in. by 6 in. The emergency brake is located on the front wheels, it being of the Bendix three shoe type, operating in 16¼ in. by 3 in. drums.

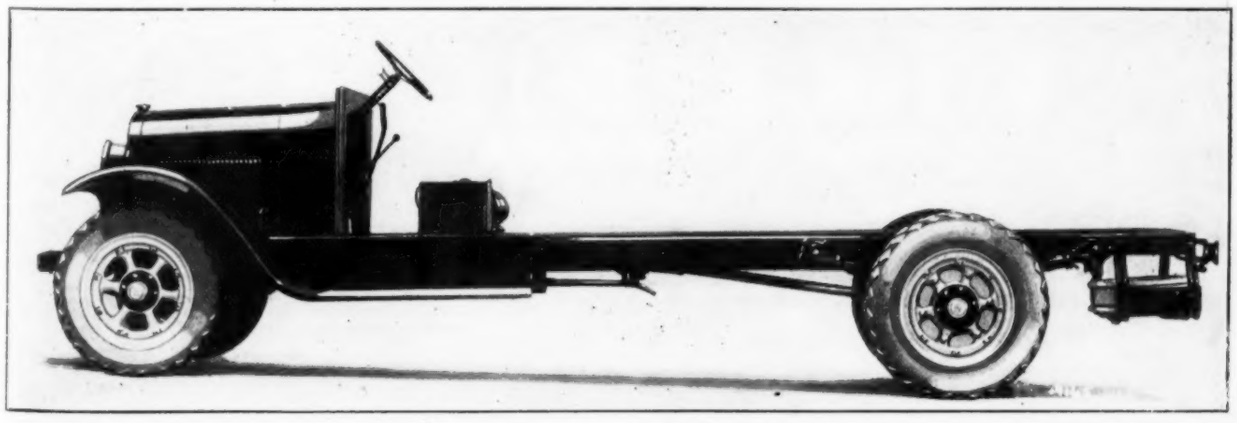
The chassis, with the exception of the axle, is lubricated by the one shot system with feed lines to all main lubricating points on the engine, clutch, drive line, spring ends and brake mechanism located on the frame. Lubricating points on the axles are equipped for the Zerk high pressure system.

The standard body designs include a 29-passenger standard car type, 26-passenger parlor car, 29-passenger Urban parlor car and a 22-passenger inter-city or sedan type. The body framing consists of hardwood paneled with Plymetl. Upholstery is in genuine leather, the woodwork is mahogany, the trimmings are nickel, and the exterior finish is enamel. Lighting is provided by means of a 12-volt electrical system, employing two 3-cell batteries.

A Graham Brothers Two-Ton Truck

A TWO-TON truck in two sizes is the newest product of Graham Brothers, Detroit, Mich. The chassis is supplied with a variety of bodies suited to various requirements. The trucks come in two lengths, the shorter for 9-ft. bodies having a wheel base of 137 in., and the longer for 12-ft. bodies having a wheel base of 162 in.

Both chassis are equipped with pneumatic tires, with



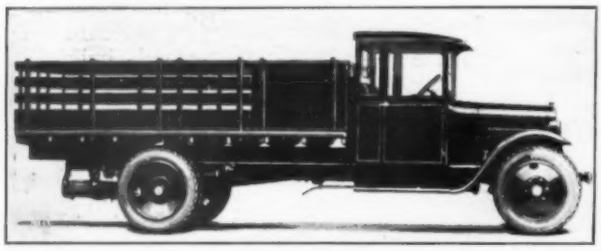
The Two-Ton Graham Brothers Chassis

either single or dual rear wheels optional. Where single wheels are used, 32-in. by 6-in. tires are fitted in front and 34-in. by 7-in. tires at the rear. For dual rear wheel equipment, disc wheels are standard, with 34 in. by 5-in. tires fitted at both front and rear.

The pressed steel frame side rails are 7 in. and 7⅛ in. deep for the shorter and longer chassis respectively. The front springs on both chassis are 37 in. long and 2 in. wide and have 9 leaves, while the rear springs are 56 in. long, 3 in. wide and have 11 leaves. The semi-floating rear axle employs a spiral bevel gear final drive with a reduction of 6.286 to 1.

Both service and hand brakes are of an internal self-alining type operating in heavy pressed steel drums at the rear hubs. The brakes are so connected that the pedal operates all four bands while the brake lever actuates only two.

The power unit consists of the Dodge Brothers four-cylinder engine with a heavy duty truck type transmission.



A Variety of Body Types Are Available

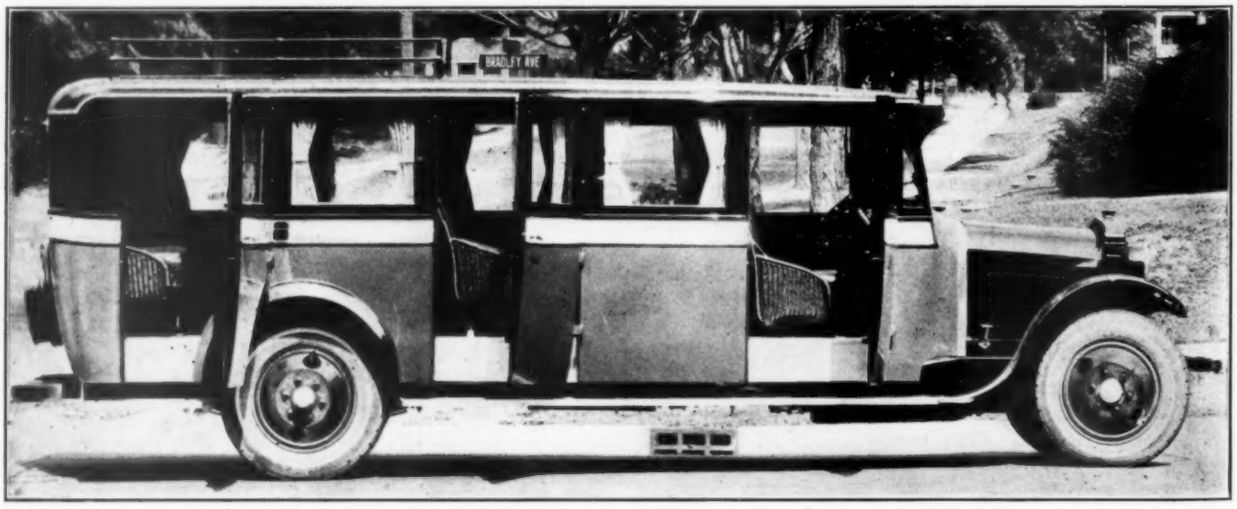
Reo Builds 17-Passenger Bus for Model W Chassis

A SEDAN type bus body for use on its model-W chassis is being manufactured by the Reo Motor Car Company, Lansing, Mich. The body is designed to provide a two-way seating arrangement, permitting accommodations for 17 passengers model when all cross seats are used or a 15-passenger model when an aisle is desired.

The seats are wicker, upholstered in genuine gray leather with head linings and side walls trimmed to match. The floor covering is linoleum and the windows are equipped with slide shades. A trunk rack is located on the roof. In addition, the 17-passenger body arrangement is equipped with a wicker hamper in the rear compartment for small luggage and parcels.

Passengers face forward in the 17-passenger model, but in the 15-passenger model the seats over the wheel housings face the center. The body is provided with four doors. The center door on the right side is equipped with a lock so that when the seats are laid out with an aisle this door may be locked and the front door used as a pay-enter door. The passengers occupying the first row of wicker chairs enter through the front door.

The Tilting Chair Gives Access to the Third Row of Seats



The Reo Sedan Bus

Those in the third row are given access through the center door by folding the right hand chair forward.

The weight of this body is approximately 600 lb. less than that of the one it replaces. A reduction in the number of doors from six to four, the elimination of partitions and the lighter weight seats have been the contributing factors. The length over all is 264 in., and the over-all width, 81½ in. The inside height is 57½ in.

Arcade Roof Body for Six-Wheel Coach

THE Six-Wheel Company, Philadelphia, Pa., has designed an arcade roof type body for motor coaches, which design is a combination of lightness and strength together with maximum head room. The overall length of the body from bumper to bumper is 27 ft. 11 in. The seats are arranged to accommodate 29 passengers with the five rear seats of the folding taxi type enabling baggage to be carried if desired. The total weight of the body, shell and hardware of the deluxe or parlor car model is 3,518 lb. and for the street car type 3,318 lb. One body shell is used for both types of bodies and both bodies have 76½-in. headroom and full entrance at the front door. The body frame is 59 in. wide which is bolted to the steel channels forming the supporting base for the body pillars, which rest directly on the steel channels and are bolted to a gusset plate on the end of the channel. The gusset plate is riveted to the channel. The bolt that connects the steel channel to the chassis frame has a heavy spring between the frame and the nuts which allows a slight motion of the body which is approximately ⅛ in. maximum after complete assembling of the frame. No side body brackets are used.

The body pillars are constructed of two parallel members of ash with spacer blocks between. The headrail is

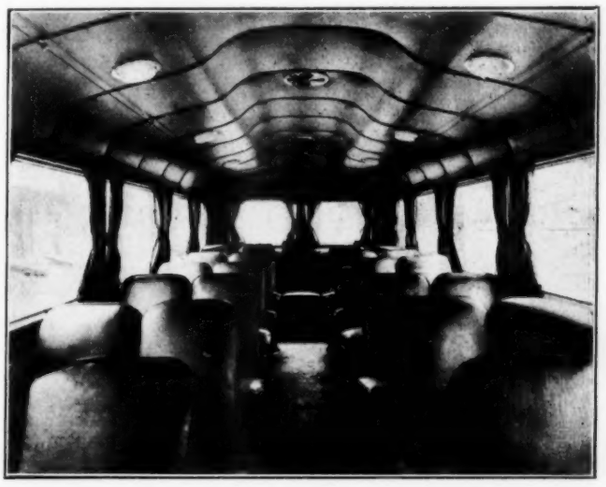
The Arcade Type of Roof Body Mounted on a Six-Wheel Chassis

constructed in the same manner. The side body pillars are attached to the headrail by bolting through plates. Diagonal steel bracing is employed between all pillars.

The roof bows are made of one-piece steam bent ash and are fitted into a steel socket which is securely bolted to the headrail. The roof is covered with lengthwise strips of plywood across the top of the roof bows which are covered with wadding and then with the usual enameled duck outside material. The inside of the roof is covered with soft material which in turn is covered with plywood lining, painted or stained as desired. The interior of the bows below the window ledges are lined with plywood with the end sections screwed to the pillars. These sections can be readily removed for window glass repair.

The floor runs lengthwise in the bus and, contrary to the practice of many body builders, has nothing to do with the structural strength of the body. The floor is covered with building felt which is cemented to the floor after which linoleum is laid on and cemented to the felt.

The interior of the body is trimmed in blue alligator leather obtaining a blending of blue, black and gray,



The Features of This Body Are Its Lightness and Headroom of 76½ in.

which does not show dust or wear as easily as the ordinary types of leather. All the wiring is in metal conduit and, in case of short circuit or breaking of the wires, new wiring can be installed without having to disturb the headlining.

The radiator used in the chassis is a United States Cartridge product, constructed of a number of copper tubes with extruded ends, all soldering being done on the outside. In case of an accident to the radiator, the damaged tubes can be removed and other tubes installed without a great loss of time or the removal of the radiator from the bus. The core is mounted in a cast aluminum shell which is supported on rubber blocks attached to a sub-frame between the main frame channels.

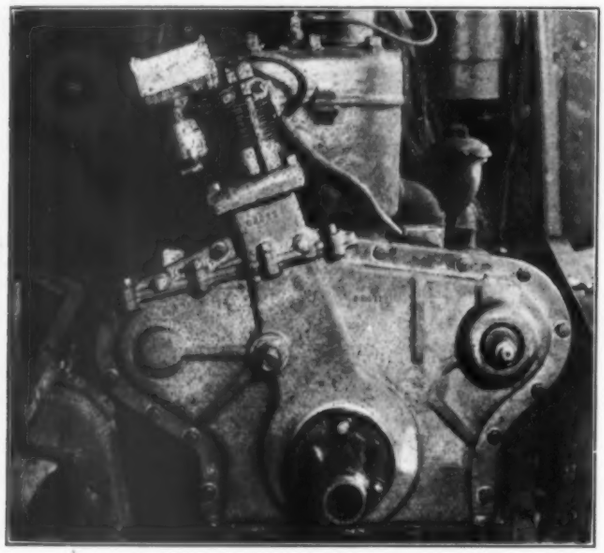
The clutch housing is ventilated in such a way so that air is drawn in between the plates of the clutch which greatly reduces the clutch temperature. Westinghouse air brakes are standard equipment as well as the Timken duplex rear axle which requires four brake shoes on each axle, or a total of 16.

Eight of these are applied by the service brake and eight by the hand or emergency brake.

Two Timken full floating rear axles of the inverted worm type held together by a centered torque tube are used on the chassis. This tube is filled with oil and allows motion between the axles either backward or forward. The axles are properly spaced by the rear springs. They are attached to the frame by a trunion mounting which allows oscillation of the unit around the trunion pin. The advantages claimed for this trunion mounting are ability to negotiate rough roads and unpaved streets at a speed impossible with ordinary construction and the elimination of the weaving of the body and frame as motion of these parts is only one-half that ordinarily felt, for with a 6-in. deflection of the axle, the frame and the body deflect only 3 in.

Air Compressor Mounted on Front End of Engine

THE experiences of the Christensen Air Brake Company, 6513 Cedar Avenue, Cleveland, Ohio, with side mounted and transmission mounted compressors have shown that they give more orless trouble. In an effort to eliminate as much of this trouble as possible, this company has developed a compressor mounted on the front end gear case cover plate of the gasoline engine. The compressor is driven directly from an eccentric on the main crankshaft. This method of



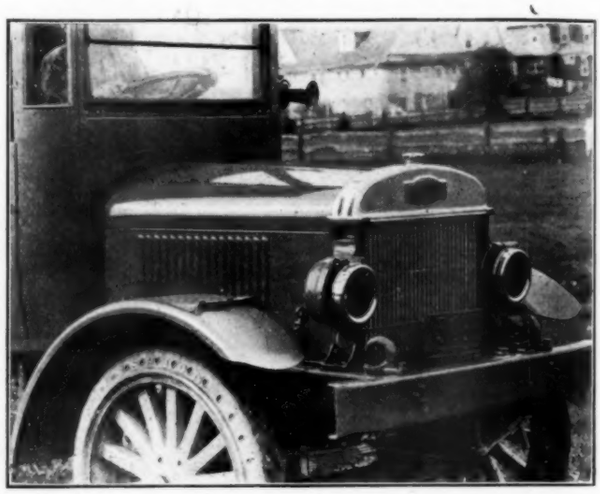
Christensen Air Compressor and Governor Mounted on the Front End Gear Case Cover Plate of a Buda Model Bus Engine

mounting the compressor makes it practically an integral part of the engine.

It eliminates drive troubles and is practically maintenance free.

Autocar Builds Three-Ton Truck With Engine in Front

THE Autocar Company, Ardmore, Pa., has announced a three-ton motor truck chassis with the engine in front instead of under the seat where it has been placed in earlier Autocar models. The engine-under-the-seat models are continued. The wheel

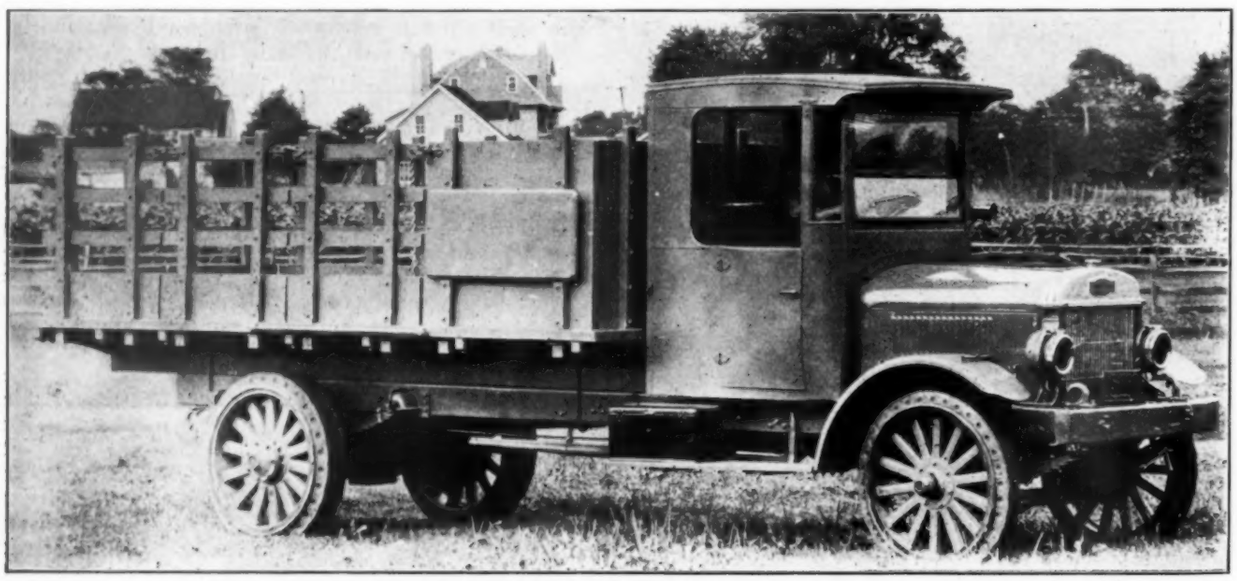


The Distinctive Feature of the New Truck Is the Mounting of the Engine in Front

base length is 172 in. and the turning circle 54 ft.

The engine is of the four-cylinder type with a removable cylinder head and crank shaft mounted on annular ball bearings. The N. A. C. C. horsepower rating is 28.9. The carburetor is the plain tube automatic float feed type and the cooling system consists of a vertical finned tube radiator with centrifugal water pump and fan. Lubrication is provided by the splash circulating system, the gear pump being located in the bottom of the crank case. A high-tension magneto with an adjustable spark is provided, as is a speed governor.

Both hand and foot brakes are of the internal ex-



The New Autocar Three-Ton Truck

panding type, operating independently on rear wheels. The springs are semi-elliptic, front and rear. The tires regularly equipped are of solid rubber, pneumatics being available at a somewhat higher price. The front axle is of the I-beam steel type and the rear, full-floating, double reduction gear drive with compound bevel and spur gear. The wheel and axle bearings are of the tapered roller type.

The total capacity of the truck, including chassis, body and load, is 15,000 lb.

Color of Mosaic Leather Penetrates the Hide

THE Radell Leather Manufacturing Company, Wilson avenue, Newark, N. J., has placed on the market an upholstery leather, called the Mosaic, the color of which penetrates through the hide so that as long as a shred of leather remains, the color will be the same as the day the leather was dyed. This leather permits of colors and color combinations which enables the manufacturers to furnish effective two-tone color schemes.

Westinghouse to Conduct Bus Brake Tests

THE Westinghouse Air Brake Company, Wilmerding, Pa., has arranged to extend its experimental work on different types of motor vehicles and different combinations of pneumatic apparatus and brake shoes and linings by means of a special brake test motor bus recently purchased for the purpose. This bus has a model 50-B white chassis, on which Westinghouse automotive air brakes are standard factory equipment, and a special type of body arranged for the particular purpose, and equipped with a complete set of recording instruments which will register accurately pressures, temperatures, stopping distance, etc.

The Westinghouse Brake-Test Bus

An exhaustive series of tests, to which engineers of the various branches of the motor vehicle industry will be invited, are soon to be conducted with this bus on the long, heavy grades of Tuscarora Mountain in southern Pennsylvania. The purpose of these tests is to secure specific data concerning the effects of various brake combinations on the heating, length and smoothness of stop, service life, etc., resulting from heavy duty such as encountered on large and heavy vehicles in mountain service, or by frequent stops in city service.

Motor Transport News

Summary of Month's Motor Transport News Reported in Railway Age

During the current month, several railways have announced expansion of their rail service by undertaking bus and truck operation. On August 29, the Baltimore & Ohio commenced operation of its passenger trains to the Jersey City terminal of the Central of New Jersey, instead of the Pennsylvania station, New York, and at the same time inaugurated connecting bus service from train side at Jersey City, to its Pershing Square bus terminal, opposite the Grand Central station in New York. The B. & O., is operating buses similarly between Newark, N. J., and Elizabeth.

The New York, New Haven & Hartford has arranged a contract with the United States Trucking Corporation and the Motor Haulage Company to have certain classes of freight hauled by motor trucks from its Harlem terminal to a "theoretical" delivery station at Fifty-ninth street, New York. The trucks will, to a certain extent, replace lighterage service now in use between the Harlem River terminal and East River piers and will speed up freight deliveries since the difficulties of taking the lighters through Hell Gate will be eliminated.

The Rutland Transportation Company received authority from the Public Service Commission of Vermont to operate motor buses from Bennington, Vt., to the New York State line. Permission to operate from the Vermont State line to Chatham, N. Y., had already been granted by the New York Public Service Commission. The buses will replace a train operated each way daily over the 57-mile route.

Fourteen new bus companies, with a total capitalization of $1,400,000, were incorporated throughout the United States in August. They are located in states in all parts of the country, including Indiana, Minnesota, Washington, Arkansas, Virginia, Alabama, Massachusetts, New Jersey and New York.

A suit testing the constitutionality of the frachise tax and seat tax, levied on buses operated in the state of Kentucky, has been filed in the circuit court at Frankfort, Ky., by an independent bus line. The suit charges that imposing both assessments subjects operators to double taxation.

Steam railways in the state of Iowa, while carrying 10,166,459 passenger during the year 1925, as compared with 21,005,413 passengers in 1910, derived more revenue last year from passenger transportation than they did 15 years ago, according to an analysis prepared by C. B. Ellis, statistician of the Railroad Commission of Iowa.

The Public Service Commission of New York has granted a certificate to the International Bus Corporation for the operation of a motor bus line between Buffalo and Niagara Falls. The bus company is a subsidiary of the International Railway Company, a high-speed, heavy-traffic electric line, and it is proposed to substitute buses on certain lines to meet the demand on the part of the public for bus instead of railroad transportation.

A resolution opposing any federal legislation concerning the control of motor truck transportation was adopted at the monthly meeting of the Shippers Conference of Greater New York held on September 14 at the Merchants Association. W. H. Chandler, chairman of the Legislative Committee and manager of the traffic bureau of the Merchants Association, was authorized by the organization to be present at a hearing on the subject in Washington on October 21.

Seattle-San Francisco Non-Stop Bus Line Proposed

A proposal to operate through motor bus service from Seattle, Wash., to San Francisco, Cal., without overnight stops, has been made by L. V. Norman, of Seattle, in an application for a certificate filed with the Department of Public Works of

Washington. He proposes to operate buses from Seattle and San Francisco at 8:00 a. m. two days each week, arriving at their respective destinations at 10:00 p. m. on the second day. The buses are to be equipped with reclining chairs and will have toilet facilities. They will also be equipped for serving buffet lunches.

New Truck Operators' Organization in Middle West

The Central States Automobile Conference, made up of representatives of motor truck freight carriers and highway and tax bodies in the states of Missouri, Illinois, Kentucky, Ohio, Michigan and Indiana, has been organized reach an agreement for permitting motor trucks engaged in interstate transportation of freight to operate in the various states without obtaining a license from each state. F. E. Schortmeier, secretary of state of Indiana, is chairman of the new organization. In the past many arrests have been made when truck drivers have operated from their home states into neighboring states without license to do business there.

Boston & Maine Extends Bus Service

The Boston & Maine, through the Boston & Maine Transportation Co., has recently extended its motor bus service through two new installations and through the taking over of a line not previously operated by it. Passenger train service on the Easthampton branch was discontinued and bus service installed between Easthampton and Mt. Tom on August 9. The buses make connections at Mt. Tom with through trains. The bus operation between Ashburnham and South Ashburnham, which has been operated by the railroad for nearly two years and which was one of the first bus operations in the country to replace train service, was taken over by the Transportation Company on August 21. The bus service between Manchester, Londonderry and Derry was started September 1, with 12 trips in each direction daily. The Boston & Maine Transportation Co. is now operating 30,000 to 35,000 bus miles weekly.

Commission Sanctions Service Abandonment on Grounds of Inadequate Patronage

The Delaware, Lackawanna & Western has been authorized by the Board of Public Utility Commissioners of New Jersey to abandon passenger service on its Washington-Hampton branch, 5.1 miles, effective December 1. Two trains each way a day are now operated and the average traffic from October, 1925, to April, 1926, was 3½ passengers per train. The use of the automobile and bus is assigned as the cause of the decline in traffic.

Considerable freight is handled on this line and express service will be provided on freight trains. The railroad did not contend that the total earnings on this line or system earnings were unprofitable. The commission said: "The saving in operating expense is not a controlling factor * * * The basis that justifies consideration of this case is the insufficient use of passenger trains * * * It would not be reasonable to require the operation of passenger trains irrespective of whether they carried a small number of passengers and on some trips no passengers, even though the system earnings of the railroad are profitable."

Took Passengers Where Unauthorized, Failed to Stop at Crossings—Permit Denied

The New Jersey Board of Public Utility Commissioners has denied the application of an independent bus operator for a certificate authorizing bus operation from Jersey City to Keansburg, taking passengers en route at Rahway. The application was denied on the ground that the territory is adequately served by the Central of New Jersey and the Public Service Railway. In addition, the Board found that the applicant pending the hearing made stops for passengers at other points than those specified in his application; likewise testimony showed that drivers ignored the law and failed to stop buses at railroad grade crossings.

"Buses have become a very important part of our transportation system," says the Board, "and the number of passengers carried by them is large and is steadily increasing. While the responsibility for the safety of those passengers rests primarily with the bus owners, it is the duty of the board to secure for the traveling public efficient, adequate and safe service, and this can only be obtained by approving permits where the service is necessary to careful and trustworthy operators. The testimony in this case does not satisfy the Board that the present applicant has a proper realization of his responsibility to his passengers and to the public generally."

Transport Officers

E. A. Chase, for 16 years connected with the Boston & Maine Railroad, has been appointed superintendent of the Boston & Maine Transportation Company in charge of the motor coach activities centering at Portsmouth, N. H. The new superintendent will have approximately 25 motor coaches and their crews, serving seven routes, under his direction, including both the local service in Portsmouth and the through service for which Portsmouth is an important intermediate point. Mr. Chase, who entered the employment of the Boston & Maine as a chainman in 1910, was a trainman for 7 years thereafter, and for 3 years was a passenger conductor. Joining the forces of the Boston & Maine Transportation Company, he established motor bus operations on the Franklin and Bristol branch in the fall and winter of 1925-1926, and operated highway service there under severe winter conditions. Winter service on this line was interrupted only two days. For the past five months, Mr. Chase has served as an inspector, supervising the service of the Transportation Company's motor buses.

Arthur C. Tosh, inspector of transportation and chairman of the motor coach committee of the Reading, has been appointed superintendent of highway transportation, with headquarters at Spring Garden street station, Philadelphia. Mr. Tosh was born at Oneida, Schuylkill county, Pa., on July 10, 1891, and attended school in Sheppton, Pa. He entered the service of the Reading as night clerk and operator at Catasauqua, Pa., in 1909. Subsequently he was advanced to day operator and then to operator in the chief dispatcher's office at Reading. For a time he served as extra agent at East Penn Junction and at Catasauqua and in 1916 became a regular agent and dispatcher. He was later appointed inspector in the office of the general manager and became inspector of transportation in 1918. Mr. Tosh in the fall of 1925 when the Reading first undertook the study of the possibilities of highway service assisted in making preliminary investigations and subsequent thereto was appointed chairman of the road's motor coach committee, which drew up the detailed plans on proposed motor coach operation now pending before the Public Service Commission of Pennsylvania.

A. C. Tosh

Among the Manufacturers

The American Brake Shoe & Foundry Company, New York, has incorporated a new company under the name of the **American Brake Materials Corporation** to manufacture and distribute a friction element of new and radically different principle for buses and other automotive vehicles to be known as American brakebloks. **J. B. Terbell** is chairman of the new company; **W. B. Given,** vice-chairman; **A. Aigeltinger,** president; **J. S. Thompson, M. N. Trainer** and **W. G. Blume** are vice-presidents; **G. C. Ames,** treasurer and **G. M. Judd,** secretary.